MARCH 1946

# WIRE AND WIRE PRODUCTS

IN THE FRONT RANK OF PRODUCTION

Vaughn

WIRE DRAWING MACHINERY

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

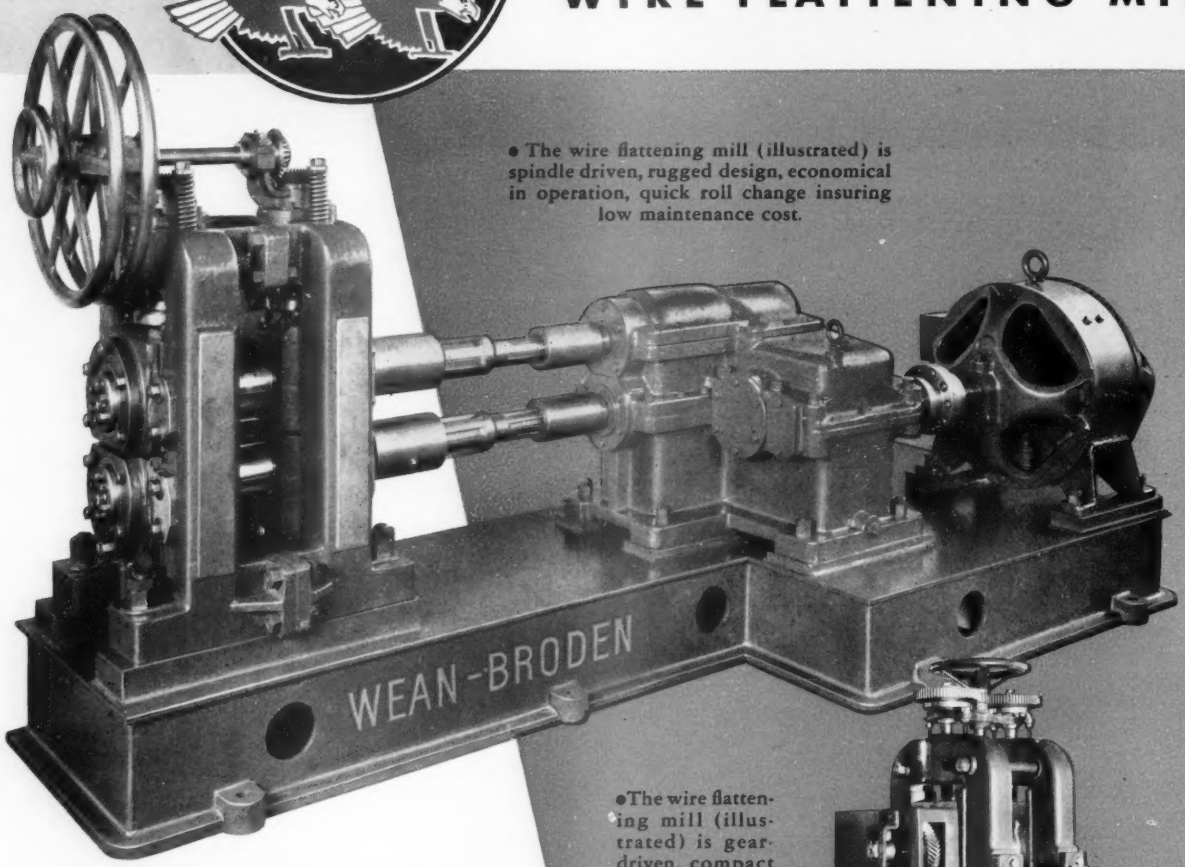
Leaders in operating ease, versatility, speed and stamina, Vaughn Motobloc and Motoblox enjoy "front and center" position in the regard of wire mill management. Let us apply the reasons to *your* problem!

The VAUGHN MACHINERY COMPANY
Cuyahoga Falls, Ohio

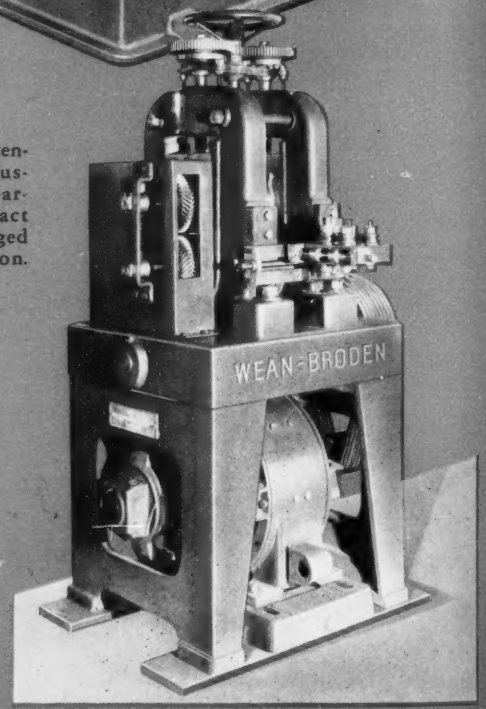
FICIAL PUBLICATION OF THE WIRE DRAWING ASSOCIATION

# WEAN • BRODEN

## WIRE FLATTENING MILLS




• The wire flattening mill (illustrated) is spindle driven, rugged design, economical in operation, quick roll change insuring low maintenance cost.




•The wire flattening mill (illustrated) is gear-driven, compact in design, rugged in construction.

WEAN-BRODEN Heavy Duty Precision Wire Flattening Mills are designed and built to insure maximum *production* . . . maximum *precision* . . . and *low maintenance cost.*

*The* **BRODEN CONSTRUCTION CO** *Inc.*

*Cleveland Ohio*

A Subsidiary Company of

*The* **WEAN ENGINEERING** *Company Inc.*

*Warren Ohio*

# Another CARBOLOY Service

## PACKAGING SMALL DIES*

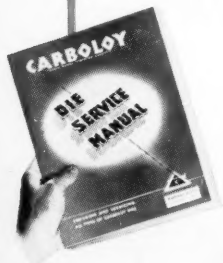
## for • CONVENIENCE
## • SAFE HANDLING
## • MOISTURE PROOFING

As another service to die users, Carboloy Company now packages Standard "Carboloy" Round Hole Dies, R-1 through R-5, in special containers holding 10 dies each. Thus, to other customer aids—the Die School, Field Engineering and the Die Service Manual—we've added this container, "engineered" to give you four important advantages:

1. Fast—easy—positive identification of size and type of die.
2. Greater ease in handling.
3. Faster inventory checkup.
4. Moisture-proofed inner coating to inhibit rust.

There's *real* economy—in *every* way—when you use these Standard "Carboloy" Round Hole Dies!

* Less than 2" casing diameter.




WRITE FOR MANUAL D-119

COMPLETE DIE SERVICE FOR WIRE, BAR, TUBING AND SHEET METAL

# CARBOLOY

(TRADEMARK) CEMENTED CARBIDES

CARBOLOY COMPANY INC., 11171 E. 8 Mile Road, Detroit 32, Michigan

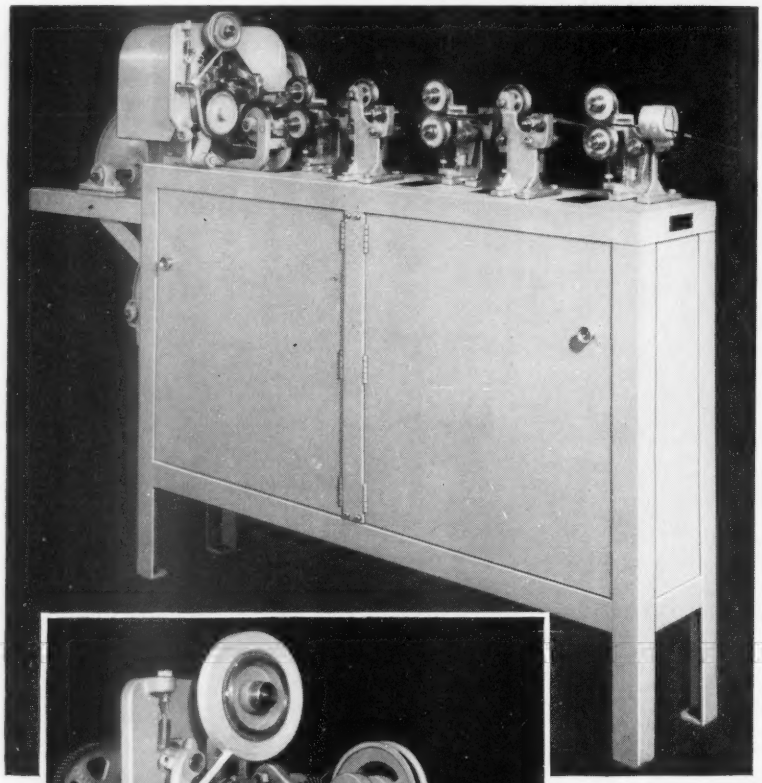
Chicago • Cleveland • Detroit • Houston • Los Angeles • Milwaukee • Newark • Philadelphia • Pittsburgh • Thomaston, Conn.

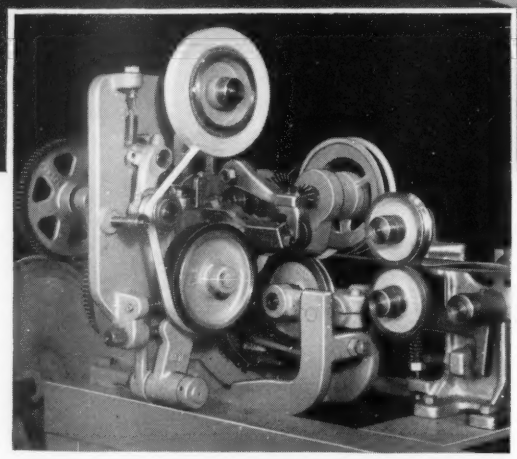
*Authorized Distributors:* Hartley Wire Die Co., Thomaston, Conn. • Michigan Wire Die Co., Detroit, Michigan

# WIRE LABELLING MACHINE
## *TYPE A*

**FOR APPLYING THE NEW UNDERWRITERS' PS* LABELS TO WIRE AND CORDS . . .**

***May also be used to apply PS* circuit-designation, customer's name, trademark or any other label.***





## OUTSTANDING FEATURES:

### SPEED

The new J.L.E. Wire Labelling Machine will apply Underwriters' PS* labels to wire and cords at speeds IN EXCESS of 1000 F.P.M., spacing the labels five feet apart.

### OPERATION

Operated by the pull of the wire through the machine, the labelling operation is not necessarily a separate one, but can be combined with any other reeling or insulating operation.

### OTHER FEATURES:

1. No chance of damage to the wire by the machine or the label.
2. Labels can be applied before wire is cut and stripped for cord sets, since labels do not affect stripping and cutting blades.
3. No danger of cutting hands of operators or customers on sharp edges, since labels have no metal parts.
4. No danger of labels disintegrating because of defective glue.
5. Labels applied by J.L.E. machine give cords and cord sets a far neater appearance.

A complete proposal covering the J.L.E. Labelling Machine for the application of the Underwriters' PS* labels will be gladly submitted on request. Ask for your copy NOW!

*Pressure-Sensitive Labels

# JAMES L. ENTWISTLE CO.

**43 CHURCH STREET, PAWTUCKET, RHODE ISLAND**

**CHICAGO OFFICE: ROOM 447, MONADNOCK BLDG., 53 WEST JACKSON BLVD., CHICAGO, ILLINOIS**

**BRITISH ASSOCIATES: GENERAL ENGINEERING CO., LTD., BURY ROAD, RADCLIFFE, LANCS., ENGLAND**

**WORLD'S LEADING MANUFACTURER OF SPARK-TESTING EQUIPMENT**

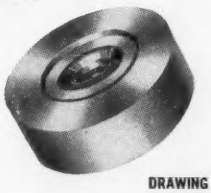


WIRE & WIRE PRODUCTS, Vol. 21, No. 3, March, 1946, Executive Office, 300 Main St., Stamford, Conn. Published by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Sec. and Treas. Publication office, 206 Summer St., Stamford, Conn. Subscription price: U. S., $5.00; Canada, $5.00 per year, 50 cents per copy; Foreign, $7.50 per year. Entered as second class mail at the Post Office, Stamford, Conn., Feb. 9, 1945, under Act of March, 1879.

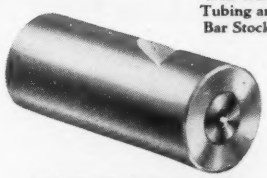
# Talide
(TUNGSTEN CARBIDE)

*Performance!*

SHEET METAL DIES
(For Deep Drawing Metal Products)



DRAWING DIES
(For Wire, Tubing and Bar Stock)



HEADING AND EXTRUSION DIES
(For Shaping and Sizing Bolts, Nuts, Screws, and Rivets)

## Talide Out-Performs Steel Die 25 to 1 on 5" Alloy Steel Tubing

Here's a recent production report from one of America's largest mills.

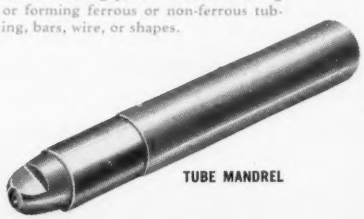
Using a Talide Die instead of a steel die on a cold drawbench, this concern produced 252,000 feet of 5" alloy steel tubing, as compared with the normal run of 10,000 feet with a steel die . . . a production advantage of 25 to 1.

This performance is not phenomenal with Talide. Made from the hardest metal known, Talide Dies stay on the job many times longer than any high speed steel. "Down time" practically disappears, enabling you to establish and maintain profitable continuous production. Scrap and rejections offer no problem because Talide Metal eliminates pickup, scoring and scratching. Equally important, with such products as tubing, these mirror-like dies impart a much higher finish.

Talide Metal is a real cost-cutter. Write for Bulletin No. 43-WP or ask one of our Talide engineers to stop in and show you how you can produce more for less with Talide Metal.

TALIDE METAL
MEETS EVERY REQUIREMENT

Metal Carbides, a pioneer in the carbide industry, makes Talide Dies in all sizes from pin-point up to 24" I. D. Used successfully in all types of manufacturing and fabricating plants for cold drawing or forming ferrous or non-ferrous tubing, bars, wire, or shapes.



TUBE MANDREL

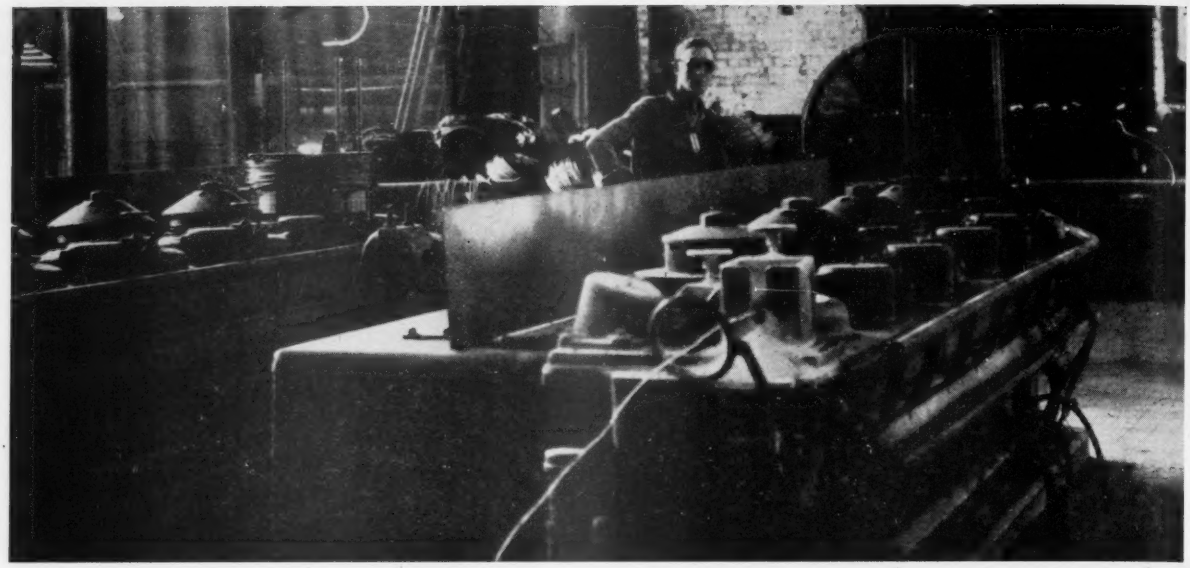
HEXAGON DIE

SQUARE DIE

THE ENGINEERED CARBIDE FOR ALL APPLICATIONS

METAL CARBIDES CORPORATION
YOUNGSTOWN 5, OHIO *Pioneers in Tungsten Carbide Metallurgy*

SINTERED CARBIDES FOR CUTTING • HOT PRESSED CARBIDES FOR DRAWING AND WEAR RESISTANCE



# HOW TO IMPROVE WIRE DRAWING

## with MAGNUS METAL COAT No. 267

For the past three years this unusual coating material has been doing an outstanding job in improving wire drawing operations. Here are the things it has shown it can do:

**NO LIMING – NO BAKING** – The trouble and expense of liming and subsequent baking are completely eliminated.

**NO HYDROGEN EMBRITTLEMENT**—All hydrogen embrittlement is eliminated right in the coating solution.

**BETTER RUST-PROOFING** – Magnus Metal Coat #267 gives excellent rust prevention, materially better than was possible before its introduction.

**BETTER FINISH** – Wire drawn with this coating has a much better finish, particularly such products as bright wire, welding wire, rope wire, tire bead wire and wire produced for metallic coating or other special finishes. Magnus #267 eliminates many troublesome cleaning jobs which formerly had to be done by the ultimate user of the wire.

**REDUCED REJECTS** – The rejects resulting from scratching and from off-size wire are reduced to practically nothing.

**LONGER DIE LIFE** – On *any* drawing operation, die life is improved when Magnus #267 is used . . . but on continuous machines at high speed, die life is particularly improved.

**REDUCED LUBRICANT COSTS**—Far less lubricant is required when Metal Coat #267 is used. In many cases this reduction amounts to 50%.

**CLEANER MACHINES AND SURROUNDINGS** – Elimination of lime makes possible much better working conditions . . . cleaner machines and surroundings.

**OVERALL COSTS MATERIALLY CUT**—Obviously Magnus Metal Coat #267 has a much higher initial cost than lime. But when the elimination of baking and the other improvements it makes possible are measured, the ultimate cost per ton of wire drawn and finished is much less than when lime is used.

*It will pay you to make a careful investigation of the possibilities of using Magnus Metal Coat #267 on your drawing operations.*

Remember that Magnus is headquarters for Wire Drawing Compounds . . . with standard and special products for every type of wire and every drawing operation.

MAGNUS

MAGNUS CHEMICAL CO., 188 SOUTH AVE., GARWOOD, N. J.

Wire Drawing Compounds

● In iron and steel plants, as well as in the non-ferrous field, wherever heat treating is done on a considerable scale, the F.E.I. Direct Fired System speeds production and reduces unit cost to a remarkable degree. This statement is fully borne out in every important installation so far made. In one large plant, where several different units were installed for test purposes, the F.E.I. won out by so wide a margin as to outdistance all competition and cause general astonishment. The records of F.E.I. performance speak for themselves—and they are yours for the asking.

Let F.E.I. engineers help you meet changing production plans and speed reconversion by making recommendations for converting present Cover Annealing Furnaces to the F.E.I. system, or installing new units.

**Direct-Fired Cover Annealing Furnaces for coiled strip, tin plate, flat sheets, wire and rod.**

•

**Spheroidizing, normalizing and bright annealing furnaces.**

•

**Galvanizing, patenting, lead annealing and salt furnaces for the wire industry.**

•

**Galvanizing furnaces for pipe, sheets and the jobbing trade.**

# FURNACE ENGINEERS, Inc.

***Specializing in the design, manufacture and installation of furnaces for the metal working industries***

1551 WEST LIBERTY AVENUE ★ PITTSBURGH, PA.

# READY TO FABRICATE SURPLUS aluminum

## AT 15% TO 45% LESS
(FOB Location)

## GOVERNMENT-OWNED STOCK

Here—in production quantities—is the aluminum you need at fixed prices, 15% to 45% off current mill prices, depending on the particular alloy. Much of this special value stock, originally ordered for war plane construction, is still in its original packing. It may be readily fabricated and is available in standard sizes and shapes. Perhaps this material is just what you need to get into full civilian production faster and it costs nothing to find out. Take these three simple steps today:

**1.** Estimate, for any convenient period, your production needs in each specification, finish, gauge, etc.

**2.** Then write, wire, or phone that data to your nearest War Assets Corporation office* below. We will advise you of the location of the stock you need, estimate possible delivery dates, quote prices and help arrange credit where indicated.

**3.** When satisfactory arrangements have been made, we will start shipments.

### * NEW SURPLUS STOCK RELEASED DAILY

War Assets Corporation is a Reconstruction Finance Corporation subsidiary in charge of disposing of surplus war materials constantly being released to War Assets Corporation. To reach War Assets Corporation, simply contact your nearest R.F.C. office listed below.

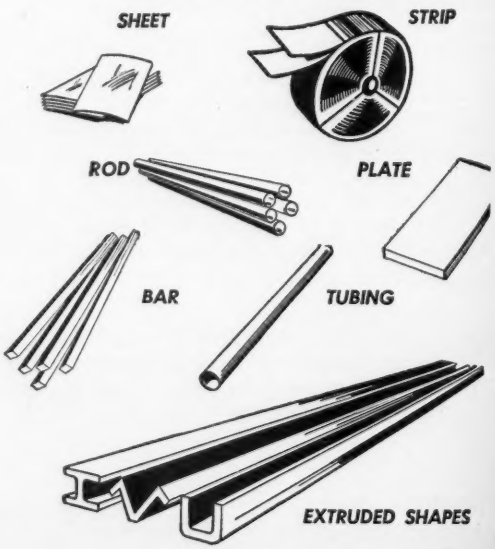
**VETERANS OF WORLD WAR II:**

**To help you in purchasing surplus property from War Assets Corporation, a veterans' unit has been established in each War Assets Corporation Regional Office listed below.**

### ATTENTION
**POWDER METALLURGISTS!**

Atomized Aluminum powder —not suitable for paint without further processing—is available in enormous quantities at 10¢ per pound. Can you find a major use for this product? If you can. . . . ! ! ! Get detailed specifications from your War Assets Corporation office listed below.

### TYPES AVAILABLE




A DISPOSAL AGENCY DESIGNATED BY THE SURPLUS PROPERTY ADMINISTRATION for Surplus Producers' and Capital Goods, Aircraft and Plants formerly handled by Reconstruction Finance Corporation . . . and for Surplus Consumer Goods formerly handled by United States Department of Commerce.

# WAR ASSETS CORPORATION
**(A SUBSIDIARY OF RECONSTRUCTION FINANCE CORPORATION)**

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157-3

# LOOKING FOR WIRE WITH WORKABILITY?

CONTINENTAL STEEL CORPORATION ★ SUPERIOR WIRE

● Workability in wire should go hand in hand with other important qualities. That's why Continental engineers work to make each wire meet *all* the requirements of its application. From furnace to finish, it is made for the job.

Continental has produced wire with superior qualities for the particular use and method of fabrication for many manufacturers. Continental engineers work with manufacturers to meet exacting requirements in wire and to cut costs. Their experience may be helpful to you.

## CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF *Manufacturer's Wire* in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire.

ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

# HUDSON WIRE COMPANY

## PRODUCERS OF FINE WIRES IN ALL METALS

### FINE BARE WIRES

High Brass, Low Brass, Zinc 99.99+ and High Tensile Zinc, Commercial Bronze, Phosphor Bronze, Pure Tin, Lead, Antimonial Lead, Tinsel Lahns, Silver Plated Copper, False Gold and Copper.

Cadmium, Nickel Silver, 10%, 18% and 30%; Silver Plated Copper, False Gold and Special Brass and Bronze Alloys to Specification, Metallic Fibre for Packing Purposes, Copper, Bronze, Zinc, Lead and Aluminum.

### WIRES FOR METAL SPRAYING

Pure Lead, Lead Alloy, Pure Zinc, Zinc Alloy, Copper, Tin, High Brass, Low Brass, Solder Wire, High Conductivity Electric Wire.

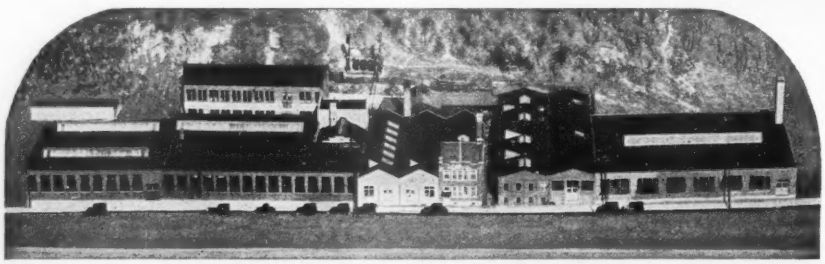
Cadmium, Nickel Silver (10%, 18%, 30%), Aluminum, Monel Metal, Phosphor Bronze, Pure Nickel, Commercial Bronze.

Look for the name — **HUDCO** — A guarantee of quality

"HUDCO" specially processed Copper Wire for enamelling purposes is drawn from Selected Copper, insuring the maximum conductivity. This is but one example of the use of the most advanced and approved materials and methods in our processing.

BETTER WIRE AT LOWER COST

*Write for Prices and Samples • Let Us Quote on Your Requirements*



"HUDCO" PLANT AT OSSINING, NEW YORK

# HUDSON WIRE COMPANY

Established in 1902 — Successors to Royle & Akin

## OSSINING, NEW YORK

RUSTLESS DATA SHEET NO. 1

# Why use RUSTLESS Stainless Steels?

For innumerable applications, stainless steels are the most economic engineering materials known.

**A few of the many advantages of using Stainless Steels are . . .**

### DURABILITY

Stainless Steels have remarkable resistance to a wide variety of corrosion conditions and to the effects of high temperature exposure; no plating to peel or wear off; no paint to chip; possess resistance to abrasion and erosion and eliminate contamination.

### TOUGHNESS

Stainless Steels will absorb great shock loads even at extremely low temperatures and have exceptional endurance strength; yet they can be machined, formed and welded with ease.

### STIFFNESS

With high elastic moduli, Stainless Steels have nearly twice the rigidity of copper base alloys—three times that of aluminum—five times that of magnesium—and many times that of plastics. This is important when designing for minimum space.

### STRENGTH

Over a wide temperature range Stainless Steels, depending upon grade and size, offer: tensile strengths ranging from 70,000 to 300,000 pounds per square inch; high yield strengths; high strength-weight ratios, thus permitting lighter, safer, and more dependable structures.

### ECONOMY

In spite of somewhat higher initial cost compared to ordinary steel, Stainless Steel products have long life at low maintenance which results in best overall economy. Fabrication costs which often constitute the bulk of total costs can be reduced by the application of proper techniques.

### SALES APPEAL

The clean, bright surface of Stainless Steels has captivated public acceptance for appearance, sanitation and utility. Consumer articles marked "Stainless" sell quickly. Process equipment made of Stainless induces cleanliness, efficiency and better working conditions.

## HOW TO SELECT THE PROPER STAINLESS GRADES

There are many grades of Stainless Steels. Each has its own composition, physical characteristics, mechanical properties and degree of corrosion resistance and workability.

Because the characteristics of Stainless Steels differ from one another and from other materials, you will want to consult Rustless—America's specialists in Stainless Steels—for data and experience necessary for proper design and selection.

All Stainless Steels contain as a basic ingredient ten percent or more chromium. It is this element which produces the corrosion and scale resisting properties. Such elements as nickel, molybdenum, columbium, titanium and several others contribute special attributes.

### THERE ARE THREE BASIC GROUPS OF STAINLESS STEELS

| | | |
|---|---|---|
| **Straight Chromium—Hardenable by Heat Treatment** | | A wide range of physical properties may be obtained by quenching from hardening heat. The high carbon grades are generally used in the hardened and stress-relieved condition. |
| Rustless 12 | Type 410 | |
| Rustless 12T | Type 403 | |
| Rustless 12FM | Type 416 | |
| Rustless 13-C-35 | Type 420 | |
| Rustless 13-C-35FM | Type 420F | |
| Rustless 16-2 | Type 431 | |
| Rustless 17-C-60 | Type 440A | |
| Rustless 17-C-80 | Type 440B | |
| Rustless 17-C-100 | Type 400C | |
| Rustless 17-C-100FM | Type 440FM | |
| **Straight Chromium—Non-Hardenable** | | Superior in corrosion resistance to above group. Generally used in annealed or soft condition. |
| Rustless 17 | Type 430 | |
| Rustless 17FM | Type 430F | |
| Rustless 21 | Type 442 | |
| Rustless 27 | Type 446 | |
| **Chromium-Nickel—Hardenable by Cold Work Only** | | Highest corrosion resistance of all. Non-magnetic when annealed, becoming magnetic as cold worked. Exhibit extraordinary resistance to stress concentration. |
| Rustless 18-8 | Type 302 | |
| Rustless 18-8 | Type 304 | |
| Rustless 18-8FM | Type 303 | |
| Rustless 25-12 | Type 309 | |
| Rustless 18-12-3Mo. | Type 316 | |
| Rustless 18-10-Ti | Type 321 | |
| Rustless 18-10Cb | Type 347 | |

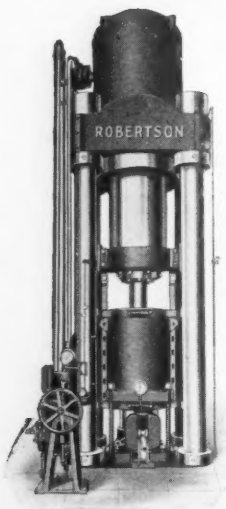
Rustless

DIVISION OF ARMCO

SALES OFFICES:
BALTIMORE • BOSTON • BUFFALO
CHICAGO • CINCINNATI • CLEVELAND
DETROIT • LOS ANGELES • MILWAUKEE
NEW YORK • PHILADELPHIA
PITTSBURGH • ST. LOUIS
DISTRIBUTORS IN PRINCIPAL CITIES

STAINLESS STEEL SPECIALISTS
**RUSTLESS IRON AND STEEL DIVISION**
*The American Rolling Mill Company*
BALTIMORE 13, MARYLAND

# Always— One Star Shines Brighter—




Cable Lead-encasing Press

. . . like Polaris, guide-star for the navigator, whose beams reflect the responsibility entrusted by many. Just so, in every field, there is one company whose consistently higher standards of workmanship catch your attention. Their trust-worthy dependability *holds* it.

Robertson hydraulic equipment can rightly take its place among such leaders. For the John Robertson Company continually pioneers in engineering advancements to bring the finest in performance and craftsmanship. Robertson's service over a period of years to the leading manufacturers of lead-encased cable and rubber hose in the United States and Canada testifies to the faith and trust that belong to all Robertson Equipment.

JOHN **Robertson**
COMPANY INCORPORATED

**125-135 WATER STREET, BROOKLYN 1, NEW YORK**

**Designers and Builders of all Types of Lead Encasing Machinery**

**Since 1858**

# WEAVERS OF WIRE SCREENING —

## ALCOA ALCLAD ALUMINUM WIRE MAKES INSECT WIRE SCREENING

## NON-STAINING • LONG-LIVED • STRONG!

Fifteen years of Alcoa research have developed the *right* aluminum wire for weaving long-lived screening. Leading weavers are already employing it to meet the enormous demand for a better wire screen.

### IT ENDS SCREEN STAIN . . . AND IT'S STRONG!

No unsightly staining of light paint or masonry, because aluminum can't rust or produce dark stain. Every homeowner will recognize this advantage.

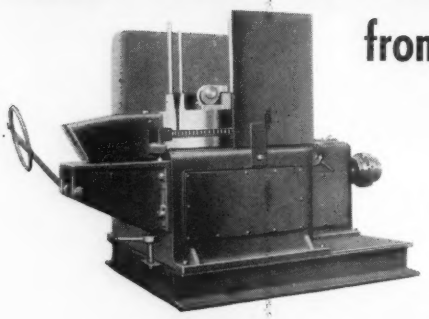
### "JUST ANY ALUMINUM" WON'T DO

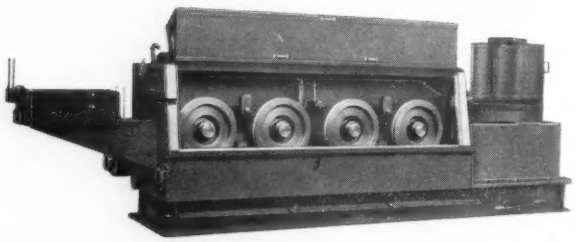
If it would, this announcement could have appeared years sooner. Alcoa research has long been studying the problems of screen life in various climates—the problems of weaving aluminum wire. Now, we offer proudly the *right* aluminum for screens.

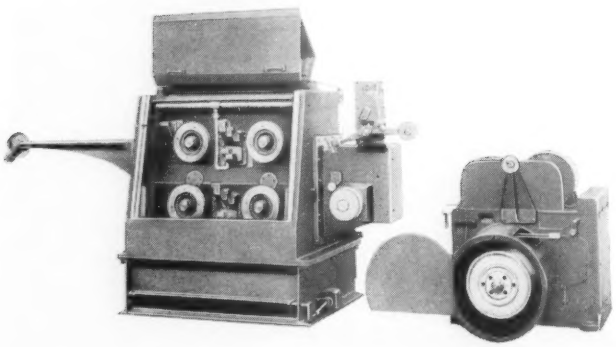
For prices on Alcoa Alclad Aluminum wire or rod for drawing into wire, get in touch with the near-by Alcoa office. Or write ALUMINUM COMPANY OF AMERICA, 1828 Gulf Building, Pittsburgh 19, Pa.

# COMPLETE

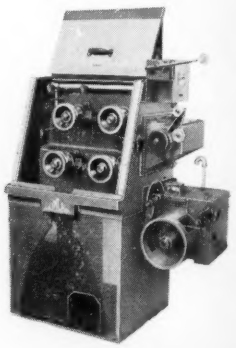
## from rod to any size non-ferrous wire with SYNCRO equipment







THE complete SYNCRO line includes every type of wire drawing and accessory equipment required to completely equip a non-ferrous wire mill—from rod to finished wire. And every unit of SYNCRO equipment is designed to operate at peak efficiency with related units—which eliminates many production "bottlenecks." For efficient, profitable, high speed, quality production, start now to standardize on SYNCRO.



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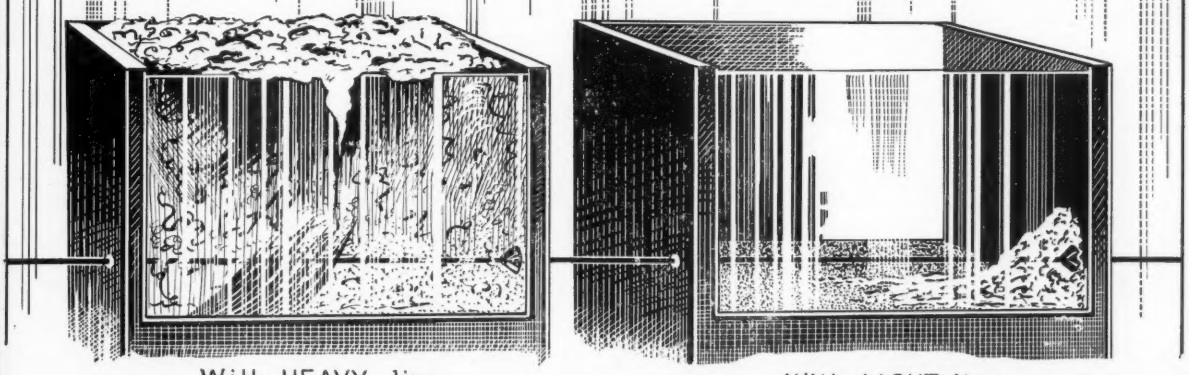

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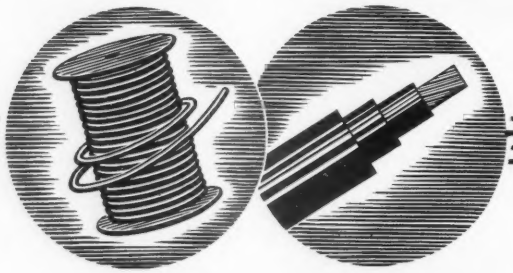

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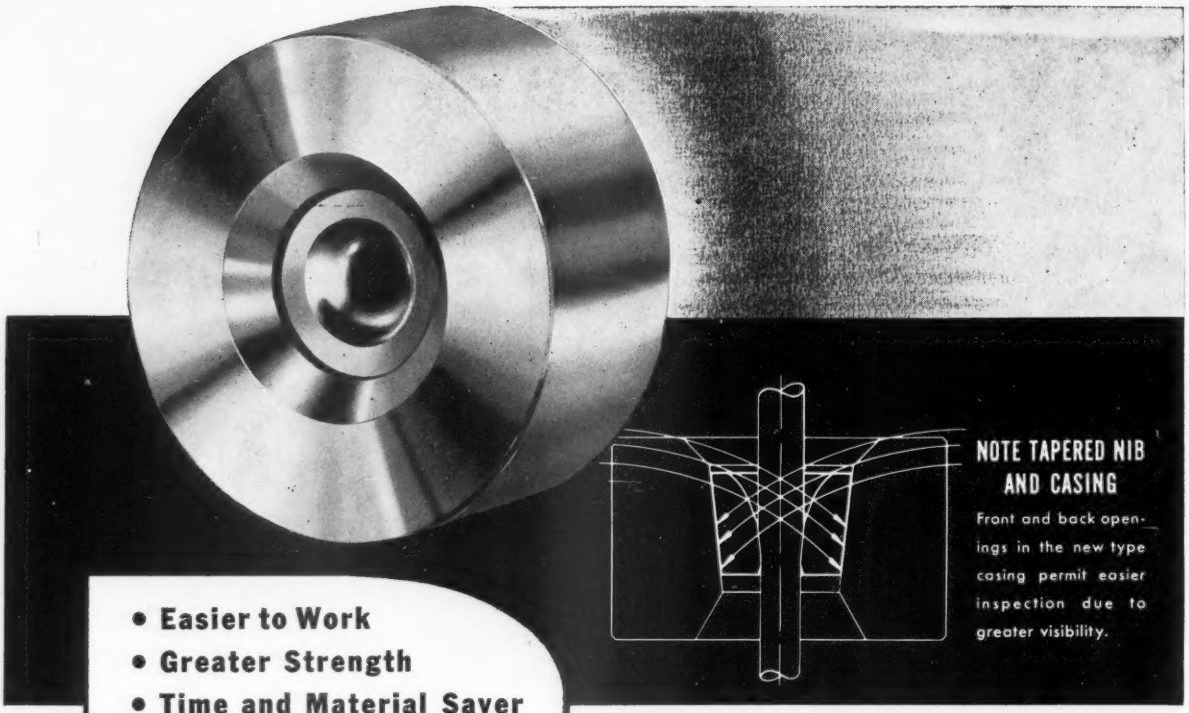

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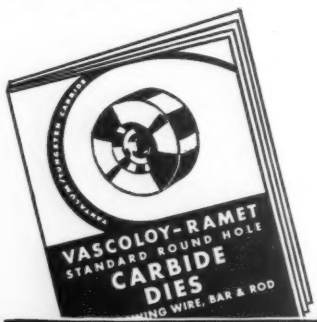


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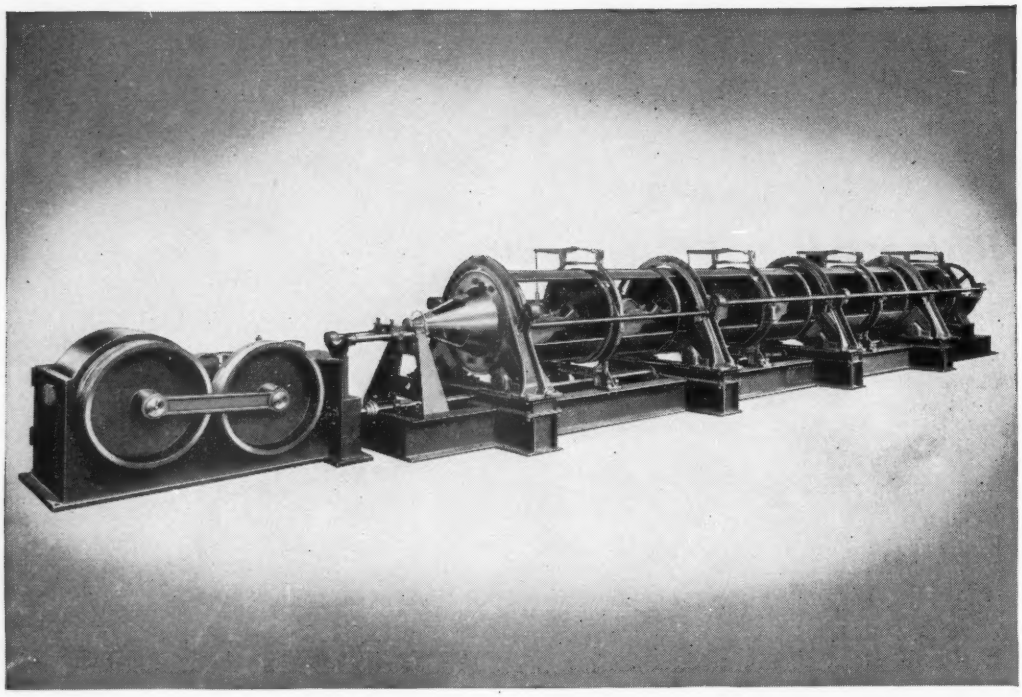

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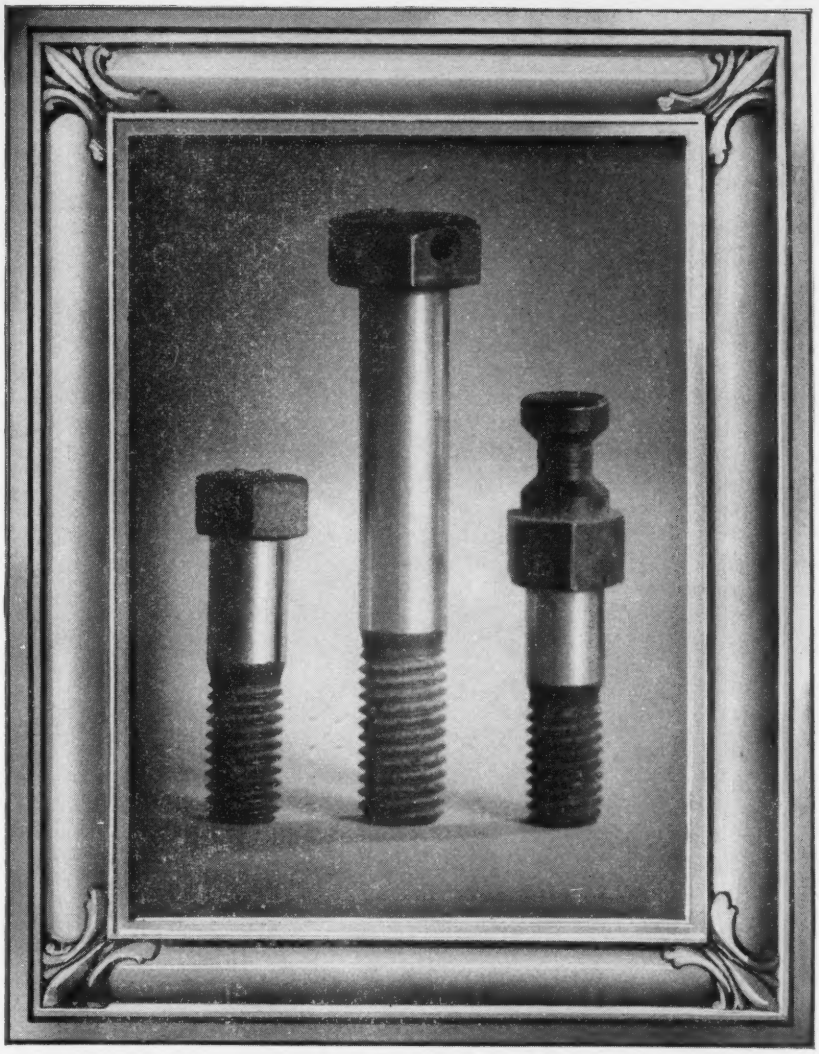

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# The Wire Outlook

The devastating steel strike is now a matter of history but the baneful effects of this and other major strikes will be felt for months to come. It may well be questioned as to whether union leaderships are primarily interested in increased wages to offset rising living costs and improve the purchasing power of their members, when it is considered that wage losses will take years to make up, or whether there is a ruin-then rule motive behind the tactics pursued. The strikes were settled by force of political rather than economic considerations—basic issues have not been settled. The Administration again "flunked" its opportunities to heal a fundamentally unsound employee-management relationship and will probably continue to resist efforts to bring about basic and needed changes unless an aroused public opinion forces action.

During the strike interlude, orders for steel fell to a low level, but mills again will be swamped with demands that they will be a long time in working off. Customers for rods and wire are finding it hard to understand why the cessation of the strikes should not mean an immediate resumption of shipments. The case of one large mid-western mill may be taken as fairly typical. It will be two weeks before steel is being poured from the big furnaces. Initially, this steel may be so full of sulphur and phosphorous as to be unsuited to use for rods and wire. Assuming, however, that it will, a month will elapse before billets are ready to be rolled, and sixty to ninety days before shipments of rods and wire can begin in quantity. This mill has just about a week's supply of rods on hand—a drop in the bucket.

Added to this is the problem of prices. The basic increase allowed will barely offset the wage increase, but does not cover the extra amounts needed to meet the cost of making nail, cold heading galvanized and spring wire, on which many mills were losing money before the strike began and which they cannot go on making indefinitely without relief. A recasting of what can be made at a profit is in the cards. New brand names may appear.

It has been generally felt that during the war period labor's efficiency lessened—some estimates running as high as 35%. Some mills are trying to induce in employees an attitude of mind that will increase individual production efficiency. This is essential, but it might also be suggested that many mills could also cut costs by taking advantage of more modern equipment that is available.

Equipment, of course, is not easy to get in a hurry. Strikes in the steel and electrical industries, plus a shortage of help, have slowed down the ability of machinery men to make anything but extended promises on deliveries.

The wire drawing die industry has been flat for some months, but it may be expected that in another thirty days the concerns making them will begin to receive a volume of orders that will approximate war-time levels.

Diamonds are becoming increasingly hard to get and it is thought by some that dealers are hoarding for higher prices. Manufacturers who had the foresight to lay in stocks of diamonds are in a fortunate position.

Canada has not had parallel strikes, but the shortage of steel has had the same effect. One mill, closed because of lack of rods, has been taking the opportunity to install high-speed continuous equipment and making other changes that will improve its operating efficiency.

East and West, North and South, in ferrous and non-ferrous mills and in the forming and fabricating plants dependent upon them, the story is the same. One electric wire manufacturer, not on strike, has kept going on a hand-to-mouth basis, not knowing at the end of any one week whether they would run the next.

The need of the moment is PRODUCTION—the unstinted efforts of both labor and management to make more rods and wire than ever before in history. Customers are plentiful and jobs are going begging, but the outlook is bright if only we can attain high unit production.

*—from the Editor's Desk*

*Close-up*

IN A LARGE BATTERY

OF MORGAN-CONNOR

WIRE MACHINES

*In Action*

*PLAN NOW WITH* MORGAN

W-116

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# WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 21 MARCH, 1946 No. 3

Designated as

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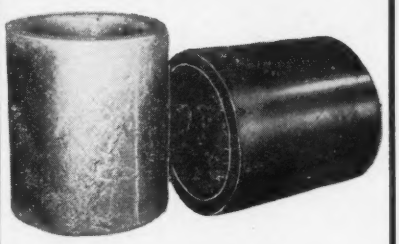

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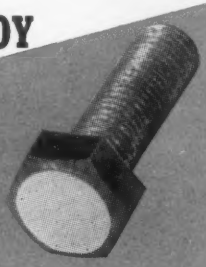

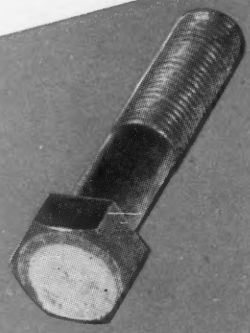

**MADE WITH STEEL**

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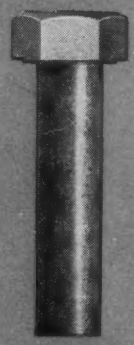

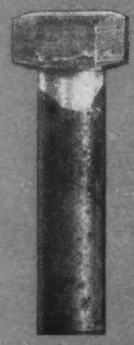

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**Shaving necessary under head on both shank and washer face.**

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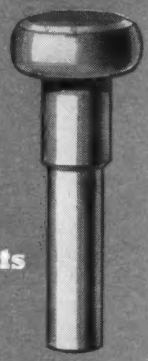

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# WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
Wire Products and Insulated Wire and Cable.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 21 MARCH, 1946 No. 3


# The Crum Calculator For Wire Drafting


By E. J. Crum,

Foreman, Wire and Rod Division,
Bethlehem Steel Company, Sparrows Point, Md.


AS with many another branch of science, World War II gave a tremendous impetus to the science of graphical and mechanical computation. High speed bombers were navigated to their targets with the aid of graphical computers. Over the targets the planes were flown and the bombs were dropped by that wizard of all mechanical computers —the Norden bombsight. A little gadget called the Graphical Firing Table which closely resembles an ordinary slide rule has been singled out as the greatest contributing factor in making the United States Army Artillery the most deadly and accurate on earth.

✦ ✦ ✦

LIKEWISE within the wire industry a number of charts and calculators for giving information quickly and accurately have been developed during recent years. Among these are the charts presented by the author before the Wire Association in 1943*.

*"The Graphical Solution of Wire Mill Mathematical Problems": Wire & Wire Products, October, 1943.

The Crum Calculator in its finished form as described here is a real aid for wire mill production men. The original idea was described in WIRE & Wire PRODUCTS of October 1943. ✦ ✦ ✦ ✦

E. J. CRUM

E. J. Crum was born in Virginia, Illinois, January 5th, 1909. Graduated from Missouri School of Mines in 1929 with a B.S. in Metallurgical Engineering. Entered the employ of Bethlehem Steel Company in 1929. Engaged in experimental and development work on Bethanized wire from 1933 to 1937 at which time he became General Foreman of Bethanizing and Galvanizing Departments, Rod and Wire Mills, Sparrows Point Plant.

OUT of the constructive criticisms and suggestions of the users of these charts has been evolved the "Crum Calculator for Wire Drafting." This simplified calculator is designed to show the whole picture of a given wire drawing mathematical problem in one setting. Without running off the scale or using a slide or other auxiliary equipment, the calculator can be set rapidly to show the number of holes, the percentage draft per hole, the total reduction of area, the intermediate die sizes, and other special information required by the user.

✦ ✦ ✦

## Description of Calculator

THE Crum Calculator is composed of two main parts and one auxiliary connecting part. (See Figure 1)

✦ ✦ ✦

PART A is the diameter dial, a circle whose circumference bears scale graduations representing wire diameters from .005 inch to .500 inch.

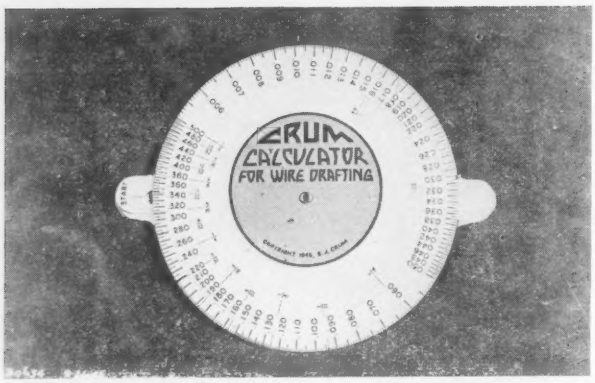


Figure 1.

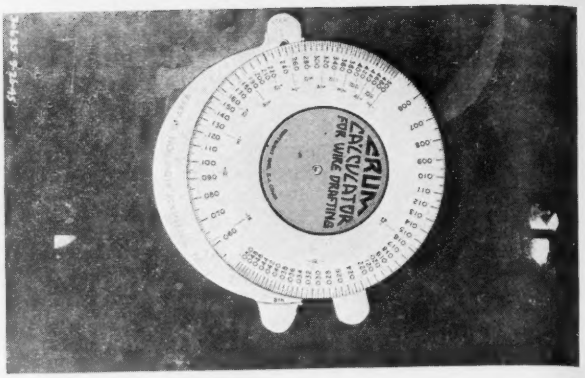


Figure 2.

PART B, also a circle with the same diameter as Part A, carries the equi-draft curves and the percentage reduction of area scales. The equi-draft curves numbered from 1st to 8th are constructed in such a manner that they divide the circular diameter scale in equal reductions in area per draft where the diameter dial circumference passes through the origin of the curves and intersects them. This equal percentage reduction per draft is indicated by the intersection of the circumferences of the diameter dial and the equi-draft curve circle, the latter of which bears a scale graduated in per cent.

✦ ✦ ✦

SUPERIMPOSED on the equi-draft curves and printed in a different color are a set of curves and a scale indicating the total percentage reduction of area from the starting to the finishing size. These curves are actually leader lines which intersect the circumference of the diameter dial and connect these intersections with the total percentage reduction scale.

✦ ✦ ✦

AN auxiliary carrier part connects parts A and B together to facilitate the operation of the calculator. Part A is pivoted at its center to the center of the carrier which in turn is pivoted to Part B through the origin of the equi-draft curves in such a manner that the circumference of the diameter dial always passes through the curve origin. This point is marked with the word "START".

## Examples

THE operation of the calculator can best be explained by the solution of specific problems. The device is designed to be held in the left hand and operated with the right hand.

✦ ✦ ✦

### Percentage Reduction of Area

**Example 1.**

DETERMINE the reduction of area in drawing ¼-inch diameter rod to .120 inch wire.

✦ ✦ ✦

**Solution 1.**

TURN the diameter dial until ¼-inch is opposite "START". Swing the carrier until the dial circumference coincides with the "Total Percentage Reduction of Area" scale (see Figure 2). Opposite .120 on the dial read 77 per cent.

✦ ✦ ✦

FROM this one setting all reductions of area from thirty to ninety-eight per cent of the starting size can be read.

✦ ✦ ✦

### Duplication of Physicals

**Example 2.**

SUPPOSE that in Example 1 the tensile strength of the stock is such that the drawing process produces a tensile strength of 100,000 pounds per square inch in the .120 inch wire. To develop the same tensile strength in an .080 inch diameter wire, what stock size is required when the tensile strength of the stock is assumed to be the same as that in Example 1.

✦ ✦ ✦

**Solution 2.**

RETAIN the same position of the calculator and turn the diameter dial until .080 is opposite 77 which in Solution 1 was found to be the percentage reduction of area in drawing ¼-inch to .120 inch wire. Now read the required stock diameter opposite "START"—.167 inch.

✦ ✦ ✦

### Equi-drafting

**Example 3.**

A continuous machine is to be set up to draw .0375 inch tire bead wire six holes from .122 inch diameter stock. All drafts are to be equal in percentage reduction of area. Determine "a" the intermediate die diameters; "b" the per cent reduction of area per hole; "c" the total per cent reduction of area from start to finish.

✦ ✦ ✦

**Solution 3.**

HOLDING the calculator in the left hand in the folded position turn the dial until .122 is opposite "START". Now locate .0375 on the dial and open up the calculator until that point is intersected by the equi-draft curve marked "6th" (see Figure 3). All of the desired information can now be read from this one position.

(a) The five intermediate die di-

ameters can be read on the diameter dial at the intersection of the equi-draft curves with the circumference of the dial.

| | |
|---|---|
| START | .122 |
| 1st | .100 |
| 2nd | .082 |
| 3rd | .0675 |
| 4th | .0555 |
| 5th | .0455 |
| 6th | .0375 |

✦ ✦ ✦

(b The intersection of the diameter dial circumference "Percentage Draft Per Hole" scale indicates this value to be 32.5 per cent.

(c) To obtain the total percentage reduction of area from .122 to .0375 follow along the leader line nearest to .0375 and read on the "Total Percentage" scale, 90.5 per cent. If a more accurate result is desired the dial should be folded as in Figure 2 to coincide with the "Total Percentage" scale.

✦ ✦ ✦

TO appreciate the labor-saving property of the calculator it is pertinent to consider here that the solution of the above problem would require the following arithmetical processes: two subtractions; five multiplications; two divisions; four squares; one cube; one fifth power; four square roots; and one sixth root. Thus in a few seconds one setting of the calculator has shown the entire picture of this wire drawing problem that would have required twenty arithmetical operations consuming much time.

✦ ✦ ✦

## Minimum Number of Drafts

**Example 4.**

IN the drafting of .0625 inch diameter wire to .025 inch, no single draft must exceed 21 per cent. Determine the minimum number of holes for this job.

✦ ✦ ✦

**Solution 4.**

SET .0625 on the dial opposite "START". Swing the carrier until the dial circumference cuts the "Percentage Draft Per Hole" scale at 21. It will be noted (Figure 4) that .025 falls between the 7th and the 8th equi-draft curves. This means that eight is the minimum number of holes for this job if no one draft is to exceed 21 per cent.

✦ ✦ ✦

**Example 5.**

A CERTAIN five-block continuous wire drawing machine has a capacity permitting a draft of 33 per cent per hole on low carbon wire. For economic reasons it is desired to find the largest stock size that can be used when finishing .0455 inch diameter wire on this machine.

✦ ✦ ✦

**Solution 5.**

OPEN the calculator until the dial circumference cuts the "Percentage Draft per Hole" scale at 33 per cent. Now rotate the dial until .0455 is opposite the 5th equi-draft curve. At "START" read .124, the maximum stock diameter that can be used on this job. (see Figure 3)

✦ ✦ ✦

## More Than Eight Holes

**Example 6.**

THE Crum calculator is designed especially for wire drawing jobs involving eight or fewer drafts. Problems involving a greater number of drafts can be solved, however, with extra manipulation. For instance, if it is desired to set up a multi-draft machine to draw .0095 inch diameter wire from .0625 inch stock in sixteen drafts, the intermediate die sizes can be determined by the following procedure.

✦ ✦ ✦

**Solution 6.**

SET .0625 on the dial opposite "START" and swing the dial until .0095 is cut by the 8th equi-draft curve. Note that the 4th curve cuts the dial at .0245 which is one-half the distance and hence one-half the drafting from .0625 to .0095. Now swing the dial until .0245 is cut by the 8th curve as in Figure 4. The first eight die diameters can now be read at the intersections of the dial circumference with the equi-draft curves.

| | |
|---|---|
| START | .0625 |
| 1st | .056 |
| 2nd | .0495 |
| 3rd | .044 |
| 4th | .039 |
| 5th | .035 |
| 6th | .031 |
| 7th | .0275 |
| 8th | .0245 |

✦ ✦ ✦

NOTE on the "P.D.H." scale that each draft is 21 per cent. Holding this same position of the carrier, rotate the dial until .0245 is opposite "START". Now, the second eight die sizes can be read in the same manner as above.

| | |
|---|---|
| 9th | .022 |
| 10th | .0195 |
| 11th | .0172 |
| 12th | .0153 |
| 13th | .0136 |
| 14th | .0121 |
| 15th | .0107 |
| 16th | .0095 |

✦ ✦ ✦

HAD the requirements called for fourteen instead of sixteen

*(Please turn to page 253)*

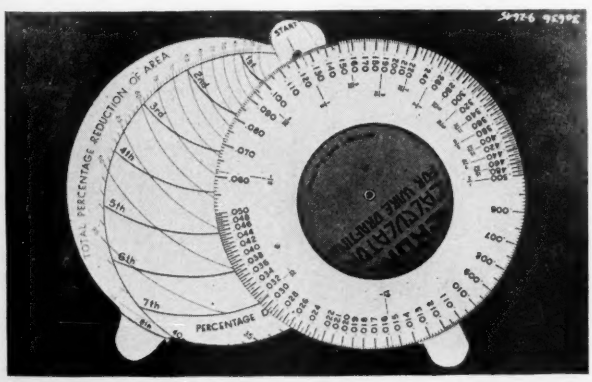


Figure 3. ✦ ✦ ✦ ✦ ✦ ✦

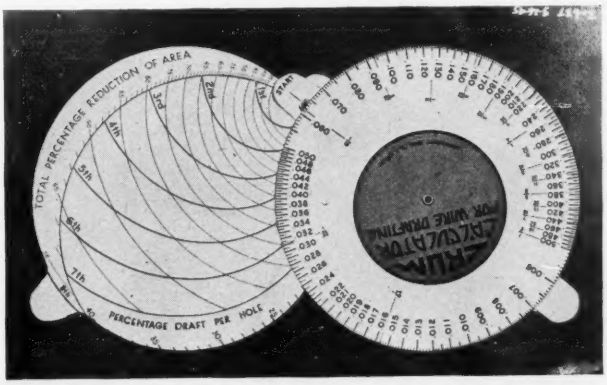


Figure 4. ✦ ✦ ✦ ✦ ✦ ✦

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# High Strength Screws From Low Carbon Steel

By George F. Meyer,

Metallurgist, Shakeproof, Inc., Division of Illinois Tool Works,
Elgin, Illinois

**The development of cold heading wire in the chemical range of carbon 0.18-0.23 and manganese 0.50-1.00 has progressed to the point where the largest users of heat treated screws have not only accepted but in many cases, are specifying its use. For purposes of identification, this material will be referred to as C-1022 in this paper although it should be understood that other A.I.S.I. numbers are included within the chemical range noted.** ✦ ✦ ✦

FOR many years the screw industry had been standardized in the use of C-1035 steel for the manufacture of high strength heat treated screws. The largest users of these parts have accepted a tensile strength of 125,000 psi, yield strength of 110,000 psi, elongation of 10%, and reduction in area of 45% as minimum standards. These physicals can be easily met by using C-1035, oil quenching for hardnesses in excess of 40 Rockwell "C", then following with a suitable drawing temperature in the general range of 500°-800° F. to get properties well above the minimum desired.

✦ ✦ ✦

THE use of 1035 has been considered desirable from a physical property standpoint because of the ease with which heat treating operations may be performed. Several other factors, however, such as heading difficulties, cost of raw material, quality of surface, wear on heading tools, dies, and punches, wear on heading machines, cost and operating difficulties of oil quenching baths, has instigated the search for and development of a material which would overcome these conditions and yet give equally as good physical properties.

✦ ✦ ✦

COLD heading wire or rods may be purchased in many different grades, generally when the items to be made are simple in design they can be successfully headed from wire drawn directly from green rods. These are rods that are used directly as received from the rod mill after suitable cleaning and coating. The resulting hard-drawn wire is often referred to as "bright-basic". A more difficult head may require a softer or more ductile wire, in which case the rods can be normalized or annealed, followed by a light draft to wire size. Normalizing of rods not only gives a softer resulting wire but of more importance is the improved surface obtained due to the fact that during the treatment the rods are allowed to scale. When this scale is removed in subsequent cleaning operations the outer two or three thousandths of surface is removed. This skin normally contains small seams which might open up during the more difficult heading operations. The smaller sizes of wire may be annealed in process at a diameter approximately 10% larger than finished size. For still more difficult jobs such as Phillips, clutch head, struck slot or other types of indented heads, the material may be both normalized in rod form and annealed at process size. For the most severe conditions of heading or because of type of material used, a spheroidizing anneal may be necessary at process size. Each of these classes of material carries a price extra.

✦ ✦ ✦

BASICALLY green rods are lowest in cost. Normalized rods would fall in the next higher price group. As each grade or quality of wire is produced, price extras are added on the basis of size (amount of drawing) and number or quality of process heat treatments used.

✦ ✦ ✦

THE material cost savings in dollars and cents in the use of the lower carbon steel listed previously is definitely appreciable over the use of C-1035. It has been found that all sizes of screws No. 10 and larger, irrespective of type of head, may be manufactured by drawing directly from the rod to wire size. All one-hole wire may be drawn if desired on appropriate wire drawers directly in front of the header. Normalized rod is required for the more difficult heads. This gives basically only, a single price extra. By comparison, when C-1035 is used, particularly on indented head, process annealed or even spheroidized wire is necessary. To the price extras for these heat treatments must be added that of wire drawing which increases with increase in the carbon content of the steel. Using C-1022 rod results in lower inventory costs because of the wide range of sizes and types of screws which can be manufactured from a few basic rod sizes. The elim-

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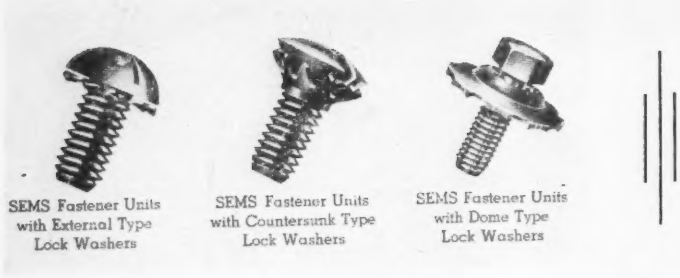
**Division of Illinois Tool Works,**
**Elgin, Illinois**

**B. S. University of Illinois 1931**
**M. S. Massachusetts Institute of Technology 1932.**
**Carnegie-Illinois Steel Co. 1933-1934.**
**Inland Steel Company 1935-1936.**
**Product Metallurgist, American Steel & Wire Co. 1937-1943.**
**Metallurgist, Illinois Tool Works, 1944 to date.**



SEMS Fastener Units with External Type Lock Washers

SEMS Fastener Units with Countersunk Type Lock Washers

SEMS Fastener Units with Dome Type Lock Washers

**Figure 1.**

✦ ✦ ✦ ✦ ✦ ✦

ination of heat treating and drawn wire extras also results in lower raw material costs. This then gives the first of a number of reasons why the use of C-1022 has found favor with the screw manufacturer.

✦ ✦ ✦

THE difficulties encountered in heading are a function of tools, setup, design of part to be headed and hardness or ductility of wire. The latter two depend to considerable extent upon the chemistry of the wire used. Under all comparable processing conditions the lower the carbon the softer the material. The softer the material the easier it is to cold head, of course, the wire must have some cold work to facilitate proper flow of the metal. This factor will express itself in terms of longer tool life both under normal wear and in breakage. The header itself will have a longer life when used on softer wire.

✦ ✦ ✦

IN addition to increased tool and machine life, the quality of the product produced will favor the use of the lower carbon wire. This softer material will flow better, is less apt to result in internal flaws, and will produce a wider range of types, sizes and heads less subject to surface defects. As the carbon content is increased throughout the range of cold heading material it becomes more difficult to maintain the surface quality of the steel. This is due to problems encountered in the open hearth and during the rolling from ingot to rod. Likewise, the hardness of rods and wire becomes greater with increased carbon content, all other factors being equal. All these conditions put C-1035 at a definite disadvantage when compared to lower carbon cold heading wire.

✦ ✦ ✦

C-1035 is definitely an oil hardening steel, while C-1022 must be water quenched to give best results. The use of the former adds cost to the heat treating operation because of cost of oil, pumping equipment and operation of same, necessity of removing oil from parts before drawing, as well as many other operating and maintenance difficulties.

✦ ✦ ✦

THESE four factors then, lower raw material and inventory cost, surface quality and hardness of material, tool and machine life, and heat treating costs, definitely favor the use of lower carbon screws wherever possible. These are cost items which influence the screw manufacturer. However, the user is interested only in performance, i.e., physical properties, and it has been necessary to prove that the C-1022 screws are at least the equivalent of C-1035 in this respect.

✦ ✦ ✦

FOR many years the manufacturer has had the established practice of specifying not only size, shape, and physical properties of all the components used in machine assemblies, but also the raw materials from which these articles should be made. It has been the contention of the engineers and metallurgists that the selection of raw material should be their prerogative without restriction from the manufacturer. Only in this way can new, cheaper, and often better materials be developed. The four war years just past have increased the acceptance of this idea due to the restrictions placed on many standard materials and the enforced use of substitutes.

✦ ✦ ✦

THE accepted minimum physical property standards of heat treated screws are listed in the first paragraph of this article. These properties are to be met by heating screws to a suitable temperature above the critical, quenching and then reheating (drawing) at a lower temperature to reduce the hardness and strength to a usable value and restore the toughness and ductility necessary to satisfactory performance.

✦ ✦ ✦

UNDER present day methods this heat treating operation is often carried out in a single continuous flow of parts throughout the entire cycle. The initial heating or hardening furnace is fed continuously from a hopper, conveyed through the furnace by belt, screw, vibrator, or shaker, and discharged directly

TABLE I

| Screw Size | Tension Load Pounds | Tensile # Sq. In. | Torsion Inch Lbs. Open Hole | Approximate Equivalent Rockwell "C" Hardness |
|---|---|---|---|---|
| 4-40 | 1000 | 192,000 | 30 | 41 |
| 5-40 | 1200 | 172,000 | 40 | 38 |
| 6-32 | 1500 | 192,000 | 50 | 41 |
| 8-32 | 2250 | 181,500 | 70 | 40 |
| 10-24 | 2750 | 181,200 | 100 | 40 |
| 12-24 | 4000 | 187,200 | 150 | 41 |
| 1/4-20 | 5000 | 179,000 | 250 | 39 |
| 5/16-18 | 7500 | 160,000 | 500 | 35 |
| 3/8-16 | 10000 | 142,000 | 800 | 31 |

into the quench tanks. Installation of a conveyor permits the removal of the parts from the quench continuously. Discharging from this conveyor into a feeding mechanism for the drawing furnace permits the screws to be dropped from this furnace directly into tote pans ready for transportation to the next operation. This line up of continuous operation can be established with almost any standard pieces of heat treating equipment providing the quantities of parts to be handled are sufficiently large or closely varying in size so that sudden changes in temperatures or speeds are not necessary.

✦ ✦ ✦

THE use of the .18-.23 carbon steels lends itself readily to continuous operation. This material is a water quenched type of steel and can be transmitted directly from quench to draw. C-1035, however, is oil quenched and must, in most cases, have the oil film removed before drawing. When water quenched the .18-.23 carbon material will exceed 40 Rockwell "C" scale in the core. A size limitation of ½ inch must be established and the severity of the quench in terms of depth of tank, agitation, or water temperature and pressure must be increased with the size. It has been found particularly advantageous to have a deep quench tank. This depth of water through which the parts fall is often six, seven, or eight feet which guarantees that the screws will be cold before they reach and start bunching up on the conveyor. A hardness of 40 Rockwell "C" is approximately equivalent to a tensile strength of 180,000 psi. Table I shows the average ultimate values for various sizes of screws as listed in the catalogue of one screw manufacturer. A tensile strength of 125,000 psi is approximately equal to a Rockwell "C" value of 25. The heat treater thus has a range of 15 Rockwell points in which to work to accomplish the ductility and toughness required.

✦ ✦ ✦

THE other heat treat problems are made easier by the use of this low carbon material. Where case hardening is necessary the .20 carbon steel is superior to the .35, both from the standpoint of carbon absorption characteristics but also because the differential in hardness and toughness between the case and core is greater and better. Secondly, wide acceptance by the trade of assembled screws and lockwashers (See Figure I) wherein the unit is handled in heat treat as a single piece has established limiting heat treating requirements. In order that locking characteristics between the washer and the head of the screw be maintained a hardness differential must exist after heat treating. The variation in hardness between screws of 1035 and washers of spring temper analysis heat treated as a unit is not sufficient. This problem is easily solved when .20 carbon material is used because basically a hardness variation of 10-15 Rockwell "C" points will exist after heat treating and be sufficient to give good locking characteristics for this type of assembly.

✦ ✦ ✦

AS a result of the many factors listed in this article, the use of C-1022 steel for heat treated screws has gained wide recognition, general acceptance and often definition specification by much of the manufacturing industry.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# Electrical And Allied Developments Of 1945

By Guy Bartlett,
General Electric Company, Schenectady, New York

**The General Electric Company issues annually a review of developments for the preceding year. This report contains extracts from it covering such subjects as may be of interest to our readers.** ✦ ✦

A REVIEW of the engineering accomplishments of the electrical industry during 1945 is a story of war and of reconversion to peace. The beginning of the year found scientists, engineers, and production men devoting all their efforts to the production of new, more and better munitions, armament, weapons; to continued work on highly secret developments such as radar, counter-radar, proximity fuses to explode bombs and projectiles close to their targets, jet propulsion of improved type, sectional floating dry docks—and equipment essential for the most secret development of all, the atomic bomb.

✦ ✦ ✦

GERMANY collapsed. Fewer munitions were needed, and American industry began to think to some extent of reconversion. Weeks later a bomb was dropped over Japan; and in three more days a second bomb. In another few days Japan collapsed.

✦ ✦ ✦

THEN the entire industrial picture changed—it was time for reconversion. Some plants found reconversion easy—just a matter of slight changes here and there in production lines or products. In most cases, however, reconversion meant major changes. From war production came much valuable experience. Industry learned many new and improved processes—acquired added precision in production techniques, discovered new basic materials with which to work, evolved machinery of increased power, efficiency, and adaptability.

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THE electrical manufacturing industry was no exception. Through all the years of the war, as well as during the National Defense Program, it had been called upon for airplane equipment of more power, less weight, and ability to withstand the worst in climatic conditions—for ship equipment that would stand the shock of big-gun fire right beside it, and which salt spray would not affect—for motors that could run hot, for electronic devices to accomplish the well nigh impossible, for insulation with properties never before attained, for metals still strong and rigid despite red heat.

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THE lessons of war production were not lost, but are reflected in the new products developed for industry, commerce, and the home. In the following review of some of the year's developments—including not only electrical but also mechanical, chemical, and allied fields—the references are to products or engineering accomplishments of the General Electric and its associated companies. Covering such a wide range as they do, the references indicate the tendencies in design and construction as well as the general progress in the electrical manufacturing industry as a whole.

✦ ✦ ✦

## Future Power

IN reviewing the Electrical Developments of 1945, it is hardly necessary to go into detail, technically, politically, or sociologically, about atomic bombs. The radio, the newspapers, and the forum speakers have told all—that can be told. There are, however, real reasons why the electrical industry is interested in atomic energy. Fundamentally, the electrical industry is in the business of generating and applying power. Waterfalls and tides have been harnessed; winds, solar energy, and subterranean heat have been utilized; gasoline- and diesel-engines have been used; and, most of all, coal, oil and other fuels have supplied heat so that steam, or mercury or other vapors, may drive turbine-generators. New sources of energy for electric power are always being sought—the airplane jet engine of the just-completed war is, in a different form, a new source of power for driving electric generators. Atomic energy, too, has its possibilities.

✦ ✦ ✦

RESEARCH scientists and engineers are conservative in what they envision as the future of atomic power.

✦ ✦ ✦

"IN the course of time—probably a considerable number of years—several prospective uses of nuclear energy will become technically possible. Whether any or all of them will be economically practical, it is far too early to predict. As we see it today, the most probable utilization of nuclear energy is as a source of heat, which may in turn produce steam or hot gases for use in more or less conventional types of power-generating equipment. Direct conversion from nuclear energy to electric power in usable form seems to us an extremely remote possibility. Were we responsible for conducting the affairs of a central station, or a

railroad, or other business in which the generation or use of power is of extreme importance, we should go right ahead with our plans for the years to come on the basis of present-day commercially available sources of energy; namely, coal, oil, and water power." This was a statement by **Dr. C. G. Suits and H. A. Winne,** General Electric vice presidents in charge of research and engineering, respectively.

✦ ✦ ✦

IN announcing that a new, much enlarged research laboratory is to be built at Schenectady, it was also stated that atomic and nuclear investigations are expected to account for between a quarter and a third of the laboratory's activities.

✦ ✦ ✦

## Cable

OVER 100,000 feet of high-voltage cable insulated with butyl high-voltage compound went into service during the year and established excellent performance records. High-voltage cable insulations compounded with butyl are extremely resistant to ozone, oxygen, acids, alkalis, oxidizing agents, heat, sunlight, and aging and have excellent electrical properties as well. Polyethylene insulation, used extensively during the war for high-frequency coaxial insulation was shown to have dielectric and physical properties desirable in such items as control, power, communication and television cables.

✦ ✦ ✦

HIGH-PRESSURE gas-filled cable for use up to 138 kv, in either ducts or pipes and suitable for 200-lb. operating pressure, was made available. The type for ducts has a reinforced lead sheath; the latter type relies on the steel pipe to withstand the gas pressure.

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## Motors

TRI-CLAD design, originally applied in 1940 to open (drip-proof) a-c motors was extended during the year to totally enclosed fan-cooled motors in standard and explosion-proof types from one to 300 horsepower. Tri-clad open motors were extended to 2000 horsepower, considerably above the previous largest 300-hp squirrel-cage induction and 75-hp wound-rotor types.

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NEW intermittent-duty polyphase motors, both open and totally enclosed nonventilated, use less power, have longer life, are lower in price, and have a lower temperature rise than the motors they superseded. They are for such applications as hoists, door openers, valves, and tool traverse drives.

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THE success of hermetically sealed compressors of household refrigerators led to a similar development in large compressors, in the range from one to 15 hp.

✦ ✦ ✦

THE widening field of application for the amplidyne led to its development in additional frame diameters and ratings. On one specific application 0.1 watt in the amplidyne control field was sufficient to excite a 1500-kw generator—an over-all power amplification factor of 15,000,000.

✦ ✦ ✦

ACCEPTANCE of the Thy-mo-trol form of d-c adjustable-speed drive from an a-c power source continued to increase rapidly, with installations in the tire industry particularly numerous.

✦ ✦ ✦

THERE will be innumerable applications for new slow-speed fractional-horsepower motors of the synchronous inductor type, featuring relatively high torque, instantaneous starting, and quick stop upon interruption of current. Counters, remote radio positioners, synchronizers, step rheostats and many more devices may be operated by them. One was designed as a self-pulsing or auto-control step motor which will successively follow a variable speed control advance in a predetermined number of definite locked stop positions—for use as elevator floor indicators, for example.

✦ ✦ ✦

BETTER ventilation, longer brush life, improved insulation, light weight, and low cost were achieved in a new line of heavy-duty motor parts developed for portable tools. About one-third of the space through the motor field is available for ventilation.

✦ ✦ ✦

MOTORS with speed regulation within ½ of 1 per cent, using conventional d-c shunt winding, were applied in large numbers during the war for radar, communication and other purposes. More accurate control, down to 1/10 of 1 per cent was also furnished, using amplidyne-type motors.

✦ ✦ ✦

## Heating

HIGHER temperatures that can be obtained with other metallic-resistance furnaces were attained in several rotary-hearth furnaces in which the heating units are rods of pure molybdenum, formed into loops and supported by refractory insulators built into the inner and outer walls of the heating chamber. Operating at temperatures up to 2500 F. the furnaces were applied to the heating of stainless steel parts for forging, heat treating of alnico magnets, and of other special alloys. A protective atmosphere prevents oxidation of both the work and the molybdenum units.

✦ ✦ ✦

MORE than thirty large electric brazing furnaces had a war job in the production of M-69 and M-74 incendiary bombs. Tray-loads of casings, double-decked for good loading efficiency, were passed through the roller-hearth conveyor-type furnace.

✦ ✦ ✦

IN the field of induction heating there had been objections to the smaller motor-generator frequency changers having open air-cooled construction. A large volume of air was required, provisions had to be made to keep the ventilating air clean, and in some locations the 3600-rpm windage noise was objectionable. Totally enclosed water-cooled sets, which can be mounted on a production floor or in an assembly line, overcame the objections and in addition improved efficiency through reduction in windage loss.

STANDARD electronic heaters, of 5-, 15- and 50-kw outputs were widely applied for higher frequencies on such jobs as localized heating for brazing, soldering, annealing, and surface hardening. The 15-kw equipment was redesigned to use a single oscillator tube instead of two smaller ones in parallel, permitting use of higher output current with greater overload capacity.

✦ ✦ ✦

### Steel and Aluminum

UNTIL V-J Day little attention was paid by the steel industry to the question of improving its facilities for rolling the so-called finished products involving cold strip mills, temper mills, annealing furnaces and processing lines, or the run-of-mine consumer goods such as bar, rod, tubing, and light structurals. Rightly its attention was all devoted to getting the maximum production possible out of its new and its rehabilitated blast furnaces and coke producers, and to increasing its facilities for so-called semi-finished steel products which form the backbone of war needs. Now the steel and other metal industries have many new and interesting possibilities for speeding up and modernizing their processes.

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SOME cold-reduction mills operate at speeds as low as 150 feet per minute; there is one with a speed of 3850 fpm. Its record-breaking production of high-quality on-gage strip has focused the industry's attention on the need of modernizing and speeding up, or building completely new mills. Single-purpose mills—one mill for tin-plate schedules and another for sheet schedules, for instance—are recommended. And it is best, the engineers have found, to build the motors special for their jobs. The drives, both motors and mills, should have the lowest inertia, or $WR^2$, consistent with good engineering, a fact which leads to the use of a wide variety of motors for successive stands.

✦ ✦ ✦

IN the several new mills and in many others being modernized, the application of amplidyne control was very conspicuous. Progress was evident in all kinds of processing lines — pickling, cleaning, slitting, shearing, galvanizing, continuous annealing, and tinning.

✦ ✦ ✦

AMPLIDYNE adjustable-voltage control was widely applied, in one case practically tripling the speed of pickling lines.

✦ ✦ ✦

A NEW draw bench, the rack type, departs radically from the conventional type of chain drive for drawing and separate drive for carriage return. The driving motor rides on the carriage and drives it through two pinions engaging racks on each side of the carriage.

✦ ✦ ✦

### Meters and Instruments

FAR-REACHING possibilities are seen for improved measuring devices in a new method for suspending moving elements magnetically. The availability of comparatively new magnetic alloys which can maintain strong and stable magnetic fields in small space led to the development of such suspension. Counteracting the force of gravity, it promises negligible mechanical friction and long-time service. Jewels capable of bearing literally tons of pressure per square inch will be used for the comparatively simple task of guiding the element instead of the difficult one of both guiding and supporting.

✦ ✦ ✦

MANY new meters, instruments, calibrating and measuring devices were produced during the year. Interesting construction was incorporated in many of them, but it is hardly possible to more than enumerate a few of them and their applications. In the field of watthour and demand measurements a novel form of thermally operated kva-demand meter was developed to simplify the problem of obtaining kva-demand indications economically on single-phase a-c circuits. An improved potential-circuit insulation was developed for the single-phase integrating watthour meter. Internal-pivot construction was applied to small panel instruments, of 3½ inches diameter, reducing their depth by about 30 per cent. A temperature recorder was developed for remote operation beyond the distances feasible for many other forms of instruments and to cover ranges not well suited to thermocouple systems. To detect shorted turns, open circuits, or seriously defective insulation in unmounted coils there was produced a high-voltage coil tester to test coils with up to 5000 turns.

✦ ✦ ✦

A HIGH-SPEED cathode-ray oscillograph for the measurement of both single and repeated transients utilizes a sealed-off cathode-ray tube, permitting simultaneous recording and visual observations of the transient on its screen.

✦ ✦ ✦

A CONTINUOUS direct reading of average torque is given by a new electromagnetic torque meter developed for measurement of torques in rotating shafts. Electronics was called into play in another torque meter, developed for the aircraft industry to measure the torque in high-speed shafts during actual flight.

✦ ✦ ✦

TO enable the operator to hold the thickness within manufacturing tolerances, a continuous gage was designed for measurement of the thickness of paper, cellulose products, rubber, asbestos, glass, and other nonferrous materials.

✦ ✦ ✦

STUDIES of smoke, powders and pigments, as well as surface phenomena which cannot be studied by x-ray diffraction because of the greater penetration of x-rays, were provided for with an electron diffraction instrument. An improved fatigue testing machine was produced with automatic control of the vibration amplitude and with the number of cycles before breakage indicated on a cycle counter; higher permissible amplitude allows greater stresses and more stable operation.

✦ ✦ ✦

THE sensitivity of the mass spectrometer, with many applications in a wide range of laboratory gas analysis problems, was increased to the point where one part of a gas can be detected in the presence of 100,000 parts of another gas. The in-

strument is capable of almost complete separation of the isotopes of mercury, and can be used for measurements of all gases from hydrogen to mercury, and for higher mass numbers with less sensitivity.

✦ ✦ ✦

ANOTHER mass spectrometer was designed to monitor continuous processes by drawing a gas sample continuously and printing successive records representative of the relative abundance of selected substances in the sample stream.

✦ ✦ ✦

A SIMPLIFIED portable mass spectrometer was applied extensively in the manufacture of valves, fittings, tanks and other items to insure complete freedom from leakage.

✦ ✦ ✦

FOR automatic control of industrial processes there was developed an acoustic gas analyzer to measure relative concentrations of gas mixtures.

✦ ✦ ✦

A NEW optical device, the rotascope, was designed to permit continuous observation of the tip of a rapidly rotating blade, and will have many additional applications. The device, which rotates a beam of light to produce a stationary image of the rotating object, is not stroboscopic; it gives a continuous rather than intermittent view of the rotating object. It can be used at very low speeds, as well as high speed, and will show transient, intermittent or random occurrences on the rotating piece.

✦ ✦ ✦

## X-Ray Equipment

NINETEEN FORTY FIVE marked the 100th anniversary of the birth of Roentgen; and the 50th anniversary of his discovery of x-rays.

✦ ✦ ✦

FOUR 2,000,000-volt industrial x-ray units were in service at the end of the year, and another was scheduled for early installation. The one at the Elwood Ordnance Plant near Joliet, Ill., was particularly outstanding. It was used for continuous x-raying of conveyorized 250-lb. bombs and 8-inch shells on the main floor, using the reflected beam, while simultaneously 240-mm shells and 1,000-, 2,000- and 4,000-lb. bombs were x-rayed in the basement, using the transmitted beam. The equipment almost entirely eliminated destructive testing, which not only ruined the shell or bomb but was inadequate for detecting defects not near the plane of cross-section.

✦ ✦ ✦

## Electronics

A NEW field for electronics announced during the year was radar—announced not because it was brand new then but because previously it was a guarded secret. Growing out of extensive research and production of radar equipment for war applications, the electronic navigator—a shipboard equipment for commercial vessels—was the first peacetime application of radar. It will revolutionize "thick weather" navigation, providing the mariner with an instrument to pilot a safe course, even though his normal visibility is strongly limited by natural conditions. The equipment can detect through darkness, fog or storm the position of any above-water obstacles, such as lighthouses, buoys, icebergs, other ships, and land, up to a distance of 30 miles, depending on the size of the object.

✦ ✦ ✦

## Carrier Current

FREQUENCY modulation, applied commercially to power-line carrier current for the first time during the previous year, was expanded last year to improve and extend the distance of transmission of all types of carrier-current voice-communication. The improved discrimination against noise obtainable through FM also made feasible the design and successful application of mobile carrier-current communication for electric utilities and railroads. The adaptation of crystal filters and oscillators to FM frequency-shift equipment brought about still further improvements in transmitting range and in noise reduction, and increased the available number of carrier channels for telemetering, load control, and similar services that require transmission over unusually long distances.

## Electron Tubes

A TRIODE similar in structure but of higher power than the previously announced "lighthouse" tube was developed as a low-power transmitting tube at frequencies up to 500 megacycles. While similar in structure, it is quite different in appearance; the anode is the larger end of the tube and is fitted with a radiator to dissipate relatively large amounts of power—depending upon the class of service, outputs of from 18 to as high as 40 watts may be obtained from two tubes.

✦ ✦ ✦

A DISK-SEAL triode with special features to facilitate anode cooling was developed to function as an oscillator or power amplifier up to frequencies of approximately 3000 megacycles, with outputs of about 5 watts as this frequency and higher outputs as the frequency is lowered.

✦ ✦ ✦

A NOVEL design of magnetron, used as a generator of high-frequency power, was provided with a steel envelope which acts as part of the magnetron circuit.

✦ ✦ ✦

## Plastics

SILICONE rubber attained prominence during the year as a high-temperature electrical insulation. Production was on a pilot-plant scale, but the material was made available for special applications requiring chemical inertness and ability to withstand temperatures of nearly 400 F. (200 C). Applications of silicone rubber had previously been confined, because of limited production, to heat-resistant gaskets for war-essential turbosuperchargers and Navy searchlights, services where rubber could not withstand the temperatures.

✦ ✦ ✦

SILICONES—unusual chemical compounds in which silicone behaves much as does carbon, its close relative, in organic chemistry—include more than this unusual rubber. There are silicone oils, greases and resins as well, also with unusual

properties. Silicone oils, applied in hydraulic applications, have remarkably constant viscosity over a wide temperature range and are so chemically inert that their structure remains unchanged under conditions that would cause petroleum oils to break down. Silicone greases were developed as a lubricant for applications at elevated temperatures or where corrosives are encountered. While closely resembling conventional resins in physical appearance, silicone resins have higher thermal stability, improved dielectric properties, and greater mechanical strength and toughness.

✦ ✦ ✦

A LAMINATE combining the mechanical properties of a fabric base with the arc resistance associated with inorganic refractories was designed for use as arc barriers where severe arcing conditions must be withstood, as in switchgear.

✦ ✦ ✦

A LAMINATE with glass-fabric base, incorporating one of the family of Permafil solventless-varnish resins, was designed primarily for such applications as coil forms for precision resistors or potentiometers where dimensional stability and superior machinability are required. The bonding resin is so tough that V notches only .003 inch deep were machined in the edges of the sheet with no fraying of the glass fiber filler.

✦ ✦ ✦

FOR radar and other electronic devices employing extremely high frequencies, where temperature requirements are above the limit of previous thermoplastics, there was developed a thermo-setting material which only softens to a rubbery gel at high temperatures and which will not flow. No decomposition is noticeable at 392 F. (200 C.), and upon cooling it hardens again without losing its shape—permitting soldering and such operations very close without permanent distortion.

✦ ✦ ✦

TO prevent leakage and general electrical instability of certain heat-resistant resin compounds in the presence of humid conditions, while retaining a fair measure of their heat resistance, a technique of impregnation with a liquid varnish was developed. Parts so treated have good dielectric strength and insulation resistance, and a water absorption of less than one per cent.

✦ ✦ ✦

WAR applications of Dri-Film water repellent included waterproofing for the soft paper filters of gas masks, as well as insulators of radio and radar components. It is an organo-silicon compound.

✦ ✦ ✦

PERMAFIL "solventless varnish," although available in only relatively small quantities, was given extended applications during the year for impregnating, laminating and casting applications, and as a base for protective coating and compound binders. The uncured material is an easily poured liquid which cures or hardens to a hard, dense solid when heated. The curing is accomplished with practically no volatile loss, particularly important in filling and impregnating applications.

✦ ✦ ✦

## Appliances

UNTIL the last gun was fired in the Pacific area, it was a story of bazookas, electrically heating flying suits and related equipment, aircraft searchlights, wire and cable, wiring accessories, and various unnamed components of munitions. Shortly before V-J day it was possible to manufacture refrigerators, portable heaters, electric irons and clocks, and to organize facilities for additional items.

✦ ✦ ✦

FOR electric blankets a new single-strand heater wire was developed to replace the prewar multistrand wire. It has a flexing life more than twelve times that of its predecessor.

✦ ✦ ✦

MANY peacetime uses are expected for improved selenium rectifiers, first designed for expendible Army and Navy ordnance. Significant advances were their reduction in size and their use as local sources of minute currents.

✦ ✦ ✦

COPPER oxide rectifiers also reflected war advances. Their inherent advantages—flexibility in location, and ability to operate economically at less than peak loads—assured their continued use for charging batteries of material-handling trucks.

✦ ✦ ✦

LIGHTER in weight and smaller in over-all dimensions than conventional nonmetallic sheathed cables, a new type, designated PVX, uses small-diameter, color-coded, thermoplastic-insulated conductors. It carries higher current than other nonmetallic sheathed cables, a new type, designated PVX, uses small-diameter, color-coded, thermo-plastic-insulated conductors. It carries higher current than other nonmetallic sheathed cable without exceeding safe operating temperatures.


**SUBSCRIBERS- Order your 1946 BUYERS GUIDE AND YEAR BOOK OF THE WIRE ASSOCIATION promptly:**

Special Price to Subscribers — $3.00 a copy. Members of the Wire Association without extra cost. Price to others and for extra copies — $5.00 per copy.

This highly useful book, a complete directory of all kinds of wire, wire products, machinery, equipment and supplies is needed by you as a reference to locate sources of supply for whatever you may need. Order your copy today from

**WIRE AND WIRE PRODUCTS**

300 MAIN STREET STAMFORD, CONNECTICUT

# Wire Association Questions and Answers

**The Wire Association is for the specific purpose of improving production methods. It has been organized as a clearing house of ideas on technical problems and research work in all phases of practical wire drawing and wire working.**

**The inquiries discussed were received from and answered by members of the Wire Association. These inquiries are sent to the Secretary of the Association who acts as a central clearing point, and neither the names of the firms, nor individuals sending in the inquiry, nor of the men or firms replying are divulged without permission.**

## Wire For Covering Hose

### Question #12451

**"We use a certain amount of wire as a reinforcing agent in various lines of hose we manufacture. Could you recommend any book covering the wire field in general that would enable us to make more intelligent selection of wire for these purposes without depending almost entirely on the wire companies' technical service, as we now do? We would be more interested in the variety of wire available and their properties, relative prices, test methods and uses than in the more technical details of wire manufacture itself."**

✦ ✦ ✦

### Answer #1

"The only book on the subject is one entitled 'Steel Wire' by Maurice Bonzel, which costs $15.00 and can be ordered from us. This is, however, a book on production processes and does not cover prices, qualities of wire, etc. I believe that your best source of information is the wire companies, and in the main, such information is dependable."

✦ ✦ ✦

### Answer #2

"In my opinion you made a very satisfactory reply to this inquiry, because I know of no book that would be in sufficient detail to cover the tremendous versatility of the wire business from which they might obtain information such as they desire. Therefore, under the circumstances, the best source for information that in all cases would be up to date would be from the people who are engaged in the manufacture of these specialty wires."

✦ ✦ ✦

### Answer #3

"It is hard for us to tell a manufacturer the kind of wire he should have, for, in the ordinary handling of things of this kind, the manufacturer tells us the kind of wire he wants or needs. However, I might say that if this manufacturer makes rubber hose, then it is a question of whether he wants it as a reinforcing agent inside the hose, or whether he merely wants to use it as a protective or reinforcing agent on the outside of the hose.

If he wants it inside, or the hose molded around the wire, then what we call Tire Bead Wire, which is used in the bead of automobile and truck tires, would be a very good product to use, although rather expensive compared to spring wire, which he would very likely use if he wanted to use it on the outside."

✦ ✦ ✦

## Barbed Wire

### Question #1461

**"We are looking for a quantity of barbed wire as follows:**

**200-3000 rolls, galvanized, approximately 100 lbs. per roll.**

**Starting from scratch and making a general solicitation of manufacturers as listed in Thomas' Register, our score so far is zero. Nobody offers anything.**

**Whom do you have to know to buy barbed wire? Is our money no good? Do we part our hair the wrong way? Or is it possible that there is no wire in the United States?**

**How about it, gentlemen?"**

✦ ✦ ✦

### Answer #1

"Answering your letter, your last surmise comes pretty close to the fact, as far as getting anything is concerned.

At the close of the war a tremendous backlog of unrated orders had been built up, that has since been augmented greatly. Added to this, the various work stoppages all along the line have curtailed wire production, and wire product concerns are living on a hand-to-mouth basis. With the shortage of wire rods, a lot of mills are easing on coarse wire production and pushing fine wire, because in this manner they secure more feet of wire per ton of rods for delivery to the hungry customers who hound them for it.

It will be a year or more before we can see some semblance of balance between production and demand and in the meantime, you'll just have to try a variety of sources and from the best promised delivery, wait patiently. Here is a list of barbed wire manufacturers you might try, if you have not already covered them. This is from the WIRE AND WIRE PRODUCTS BUYERS GUIDE.

You might also get in touch with the Reconstruction Finance Corp., in New York City. They are reputed to have such wire for disposal."

✦ ✦ ✦

## Wire Polishing Methods

### Question #4513

**"Problem—Fine steel wires. Wanted—a production method for polishing that will not change the shape of same.**

**Wire forms are approximately ⅜" x ½" or ¾" in length. The wire size is .012 to .030 in diameter, depending upon the style of the traveler. Wires are turned up on both ends and are made of tempered steel.**

**Our present method is to scour in revolving rattlers having pockets 5" x 15" x 15" using pumice about the size of coarse granulated sugar and sawdust. That gives us what we call a scour, which is a silvery material finish. The travelers are then polished in similar rattlers using scrap leather. The load in each pocket will vary from ½ pound to 3 pounds.**

**We are able to obtain a high polish but the fine travelers interlock with each other and in rotating pull out of shape."**

✦ ✦ ✦

### Answer #1

"The Rustless Iron and Steel Corp., 2400 East Chase Street, Baltimore, Md. (Mr. J. L. Cotsworth), have recently developed an electrolytic polisher that will polish small intricate wire shapes and forms, without any possibility of damaging them. It is good for steel, stainless steel and numerous other ferrous and non-ferrous metals and alloys.

The equipment is simple and relatively inexpensive, and as they are not in the equipment business, they have some modest rental basis upon which they supply them.

Suggest that you write to Rustless for information, telling them something of the batch sizes to be treated, as the device is made in various sizes."

✦ ✦ ✦

## Bright Finish On Stainless Cold Drawn

### Question #6451

**"Would appreciate advice on the most practical way to get a bright finish on Stainless Cold Drawn material. At the present time, I am using the Sullcoating which is not satisfactory to the customer.**

**The size of the material averages from ½" to 4" Rds. on Chrome and Chrome Nickel Steels, one pass draw. Would like any advice along this line to obtain a better finishing appearance.**

✦ ✦ ✦

### Answer #1

"We are getting good results in cold drawing bright stainless steel wire with Magnus Metalcoat on the usual wire reductions from the rod. Now, whether this same treatment will work out in drawing ½" up to 4" rods may be open to question. We would hesitate to say and believe that experimentation alone can furnish the answer.

Where we are using the metal coating, however, for displacing of Sullcoat and lime, there has always been an improvement in finish of the rod or wire, and increased poundage per die. There is therefore some reason to expect that our method might be helpful here."

✦ ✦ ✦

### Answer #2

"We have a material which has been used satisfactorily in drawing stainless rods and for obtaining a bright finish without any sullcoat. This lubricant has been used on lime coated rods as well as rods that have been coated with Stancoat "C". By use of Stancoat "C" a much brighter finish is obtained.

This material is compound # 108 which sells for .09½ cents per pound, F.O.B. Chicago. It is necessary when first starting in to use the # 108 to hand feed the lubricant until it obtains a rolling motion in the lubricant box. This is a paste compound and is fairly stiff when first taken from the drum in which it is shipped. After the rolling motion has been set-up no further attention is necessary except for the addition of lubricant as it is used up. If this rolling motion is not attained the rod will break."

✦ ✦ ✦

## Hot Drawing of Wire

### Question #1452

**"We are making an effort to develop information on the hot drawing of wire. We have made a literature search and find a vast amount of material on the cold drawing of wire but nothing on the hot drawing.**

**If you could refer us to any published material on this subject, or give us any information which would aid us in this study, we would be very grateful."**

✦ ✦ ✦

### Answer #1

"Probably what is referred to is the hot rolling of wire as all drawing operations are a cold working proposition.

To our knowledge there are only two concerns who hot roll wire. These are Republic Steel at Massillon, Ohio, and Indiana Steel and Wire Company at Muncie, Indiana. The amount of wire that is hot rolled is very limited and the process is followed for certain definite results required for special applications.

There has been very little published on this, and we find references to hot rolling as follows:

Hot Rolling of Copper—Page 384, 1935.

Hot Rolling of Spring Wire—Page 523, 1936.

Hot Rolling versus Cold Drawing Properties—Page 33, 1937. All are published in WIRE & WIRE PRODUCTS."

✦ ✦ ✦

## Tests Showing Corrosion of Hardware Cloth

### Question #4127

**"We would like to obtain results of field tests showing corrosion of hardware cloth buried in various types of soils. The mesh, gauge of wire used in the cloth, and type of soil used in test should be shown, as well as the length of time of exposure to the first break in the wire. In checking with our local libraries we have been unable to find any published report of such field tests.**

**Hardware cloth is used by many pest control operators to effect rat-stoppage and ratproofing. This is accomplished by burying the cloth in the ground below a building to a depth of two or three feet. This wire, therefore, is exposed to various soil types in different sections of the country. Our primary concern is to determine how long the cloth will hold up, as there has been considerable discussion as to the durability of hardware cloth."**

### Answer #1

"We regret to advise that we do not have any report of field tests showing corrosion results on Hardware Cloth buried in various types of soils.

We do not believe that such tests would be helpful, because of the great variety of conditions which might be encountered. We produce high quality standard hot galvanized After Weaving Hardware Cloth which has, for many years, given satisfactory service for rat stoppage and rat proofing, although, because of the many varieties of soil conditions involved, we cannot state how long the product would last buried in the ground.

We regret our inability to give you more information."

✦ ✦ ✦

### Answer #2

"We do not have such information regarding Hardware Cloth, but do have such information relative to Poultry Netting; as the products are very similar, we would assume the life would be similar. From many reports we have received the life when buried varies from five to ten years, depending upon the type of soil."

✦ ✦ ✦

### Answer #3

"We regret to say that we do not know of any such tests having been made, although it is quite possible there have been. It is quite possible Cornell University or the Delaware State Agricultural College at Newark, Del., have made such tests.

It is also possible manufacturers of animal pens may have made such tests. We will write one of our customers, one of the largest manufacturers of animal pens, and see if he knows of any such tests having been made, and advise you."

✦ ✦ ✦

### Answer #4

"We regret to advise you that we do not have results of field tests on this product for this particular use and therefore can give you no definite information.

However, we did contact one of the largest distributors of nettings for animal pens and cages in the West, and they advise that although they have never used standard hardware cloth in animal pens they know of cases where 1" # 17 ga. Hexagon Netting galvanized after weaving had been put in the ground in fox and mink pens and had lasted approximately as long as the material which was above the ground, and which is a period of approximately ten years. They were unable to advise what type of soil this material is buried in, nor were they able to give us any definite information regarding the locations of the actual installations.

We are passing this information along to you because Standard Hardware Cloth and Poultry Netting after the weaving operation are treated in exactly the same way, namely, the application of a zinc coating by the hot process and we feel that if 1" # 17 ga. galvanized after netting would stand up for approximately 10 years then 2" # 19 ga. Std. Hardware Cloth would approximate that life under the same conditions."

## Drawing Low Carbon Wire 9 Holes

### Question #12145

**I wonder if it would be possible for me to find out through the Association whether or not any wire mill in the U.S.A. is drawing low carbon wire 9 holes to say 19 S.W.G. from # 5 rod dry?**

**I know that this is a practice in other countries, but I have so far been unable to get in touch with anyone in the U.S. who is operating such a machine, and who would give me some information about the operation."**

✦ ✦ ✦

### Answer #1

"In answer to your letter of Dec. 14th, we think the best answer that you might secure to the question of drawing 9 holes of low carbon wire dry without intermediate annealing would be to get in touch with P. A. Beaman, Manager, Wire Machinery Dept., Morgan Construction Company, Worcester 5, Mass.

Mr. Beaman tells us that this is rather common practice in the United States, and while we asked him to give us the names of concerns who are drawing rods in this manner, he has suggested that we put you in touch with him. They have sold a lot of equipment that is being used in this manner, and possibly he can be of assistance to you on whatever phase of the problem is giving you difficulty."

✦ ✦ ✦

## Method for the Fabrication of Screw Wire for Shoemaking Machines

### Question #1065

**We have constructed a machine rolling thread on brass wire with two pairs of rolls being parallel arranged, making screw wire for the fabrication of shoes. It concerns normal 19-20 threads per 1" double thread, 2,25 mm. outer diameter, 1,65 mm. inner diameter.**

**We never obtain a clean or even good thread, and need explanation how to make these dies.**

**We are readily prepared to pay for advice and instruction with exact drawing for the making of the dies.**

**We would be much obliged for contacting us with the technician—who certainly is a reader of your paper—, that he might help us with advice, or to name us a book dealing mainly in this branch from which we could learn how to make the dies for the fabrication of screw wire."**

✦ ✦ ✦

### Answer #1

"Going over the contents of your letter, where you say that the threads are not clean or even good thread, from so far away, it appears to me as though your rollers are not set at the right angle to clear the bottom of the rollers. In other words, the corners of the rollers hits the top of the thread and causes some sort of slivers.

I would say that you should set the rollers to clear the thread at the proper thread angle and the rollers placed in a

*(Please turn to page 251)*

# GOVERNMENT WIRE PRODUCTION INFORMATION

## Industrial Reports

THE second issue of the "Bibliography of Scientific and Industrial Reports Distributed by the Office of the Publication Board" was placed on sale by the Superintendent of Documents, Government Printing Office, on February 1.

✦ ✦ ✦

THE bibliography, issued in weekly installments, contains the serial numbers, prices, and titles of reports obtainable from OPB. The reports are grouped according to subject matter. A brief summary of the contents of each report is included in the bibliography.

✦ ✦ ✦

THE price of the second issue will be 20 cents. Prices of the weekly bibliographies vary in accordance with their size, and a definite yearly subscription rate cannot yet be determined. However, the Superintendent of Documents will accept $10.00 as initial payment for the service and will notify subscribers when additional remittance is required. Copies of the bibliographies also may be purchased singly.

✦ ✦ ✦

ORDERS for the bibliographies should be accompanied by check, money order, or Superintendent of Documents coupons and should be addressed to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

✦ ✦ ✦

THE second issue, comprising 38 pages and covering 516 reports, will contain listings under the following subject headings: chemicals and allied products, with 359 titles; electrical machinery, equipment, and supplies, with 27 titles; fabricated metal products (except ordnance, machinery, and transportation equipment), with 5 titles; food and kindred products, with 4 titles; machinery (except electrical), with 5 titles; ordnance and accessories, with 8 titles; paper and allied products, with 3 titles; printing, publishing, and allied industries, with 1 title; products of petroleum and coal, with 2 titles; professional, scientific, and controlling instruments, photographic and optical goods, watches and clocks, with 10 titles; rubber products, with 2 titles; stone, clay, and glass products, with 3 titles; textile mill products, with 1 title; transportation equipment, with 28 titles, and miscellaneous, with 58 titles.

✦ ✦ ✦

THE reports described in the listings contain information on scientific and technical developments, processes, products, inventions, and related matters of potential interest

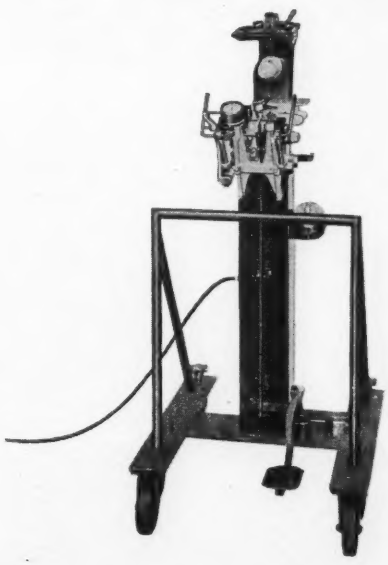
*(Please turn to page 236)*

MICROMETER PRECISION MICRO-WELD TRADE MARK REG. U. S. PAT. OFF.

**CONTINUOUS IMPROVEMENT**

MICRO-WELDERS with dial indicating annealing attachments are now available for high carbon wire.

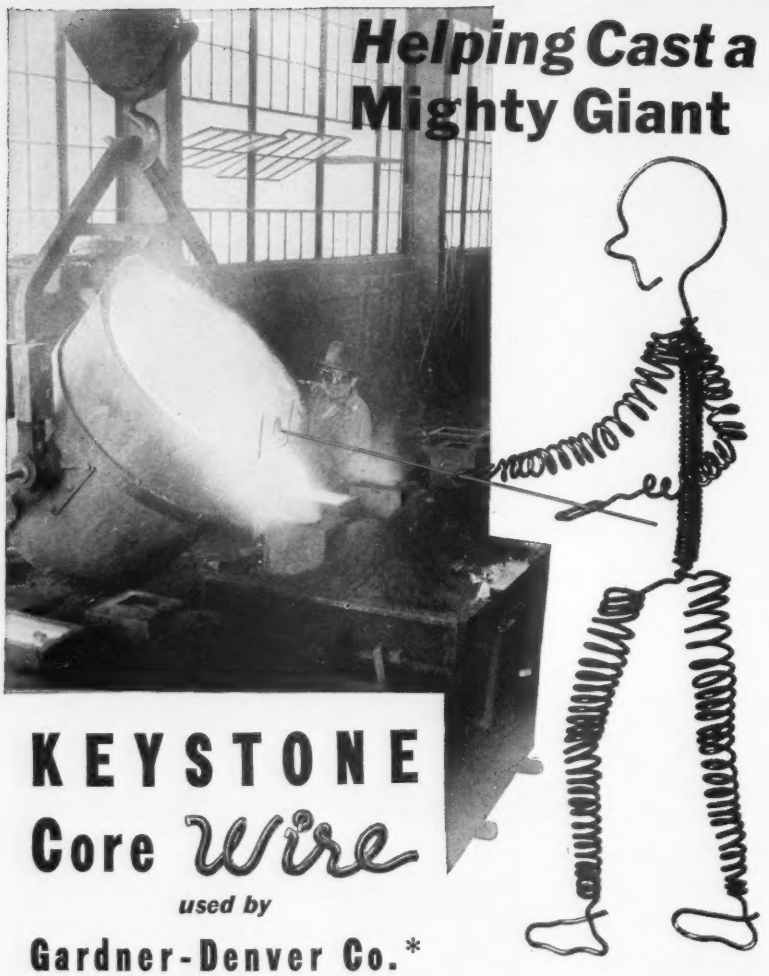
There is positive control of annealing temperature and already hundreds of these special MICRO-WELDERS are proving their dependability and satisfactory performance with leading manufacturers.



**MICRO PRODUCTS COMPANY**

20 NORTH WACKER DRIVE, CHICAGO 6, ILL.

Telephone, State 7468



**Helping Cast a Mighty Giant**

**KEYSTONE Core Wire**

***used by***

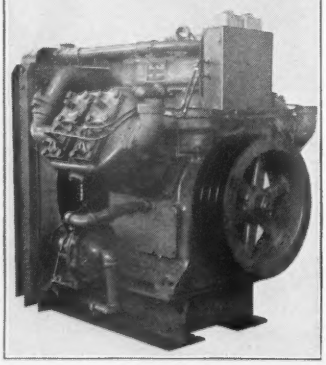
**Gardner-Denver Co.***

Many castings made by the Gardner-Denver Company for their air compressor units are both intricate and exacting. They must be relatively flawless . . . uniformly strong . . . able to withstand high pressures.

Needless to say, a great deal of skill and "know how" goes into the making of Gardner-Denver castings . . . materials are chosen with judgment and care. We are indeed proud that Keystone core wire has been selected to add its bit to the quality of Gardner-Denver products.

**Gardner-Denver Co., Quincy, Illinois*

One of Gardner-Denver's huge air compressor units—completely assembled and ready for heavy duty service.



**KEYSTONE STEEL & WIRE CO.**
**PEORIA 7, ILLINOIS**

Special Analysis Wire for All Industrial Uses

SAMSON SPRING WIRE

Coppered, Tinned, Annealed, Galvanized


## Government Wire Production Information

*(Continued from page 235)*

to American science and industry. This information previously was subject to security restrictions but has now been released for distribution by OPB.

✦ ✦ ✦

AMONG the reports listed and described in the second issue are 324 research reports, written by chemists in the employ of the I. G. Farbenindustrie, and covering several years' activity in many fields of chemical research in 10 plants of the large German cartel. A comprehensive economic survey of the I. G. Farbenindustrie, covering light metals, dyestuffs, pharmaceuticals, insecticides, synthetic rubber, and other products, also is described in the second issue of the bibliography.

✦ ✦ ✦

## United States Foreign Trade During the First Nine Months of 1945

THE Bureau of the Census has announced that the decline in United States exports of domestic merchandise during the first nine months of 1945 to $7,820 million, 28 per cent less than the corresponding period in 1944, reflected principally cutbacks in Lend-Lease shipments of military items, meat products, metal semimanufactures and industrial machinery. Offsetting these declines to some extent were increased Lend-Lease and non-Lend-Lease shipments of unmanufactured cotton and tobacco and such crude foodstuffs as wheat and corn. Total Lend-Lease shipments declined to $5,173 million, or 41 per cent below the total of $8,812 million for the first nine months of 1944, while non-Lend-Lease exports increased 26 per cent, from $2,105 million to $2,648 million.

✦ ✦ ✦

IN contrast to the decline in total United States exports, imports for consumption of merchandise into the United States rose to $3,139 million for the first nine months of 1945, a 9 per cent advance over the corresponding period in 1944. Responsible for this gain were substantial increases in imports of most semiman-

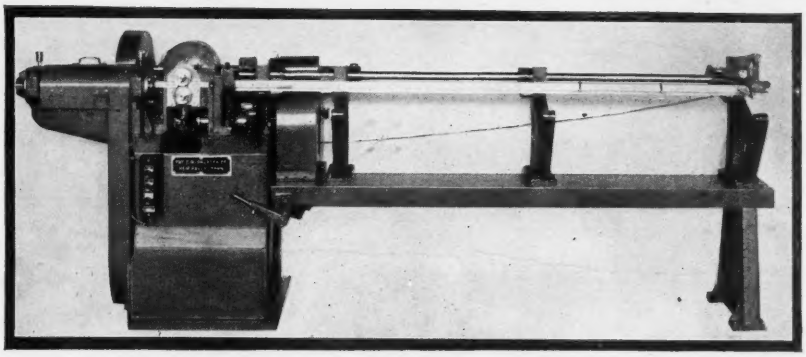
ufactures which totaled $693 million compared with $511 million for the first nine months of 1944 and of finished manufactures which rose to $648 million against $545 million for the same period in 1944. Cut diamond imports totaled $40 million in the first nine months of 1945 compared to $21 million for the corresponding period in 1944. Lesser increases were recorded for wood pulps, industrial chemicals and fertilizers. Cotton manufacture imports increased to $24 million compared with $7 million in the same period in 1944 and imports of wool manufactures rose to $12 million from $8 million.

✦ ✦ ✦

REDUCED exports of military items, principally Lend-Lease, accounted for a considerable part of the overall drop in the value of exports of finished manufactures. During the first nine months of 1945 total exports of finished products amounted to $5,374 million compared with $8,328 million for the same period in 1944. Exports of electrical machinery and apparatus and industrial machinery showed substantial declines compared with January to September 1944 levels. Reflecting heightened non-Lend-Lease shipments in the first nine months of 1945 were cotton manufactures, which showed a slight gain over the $103 million worth exported during the first nine months of 1944, exports of rayon, nylon and other synthetic textile manufactures which amounted to $38 million, a gain of 22 per cent over the same period in 1944, and agricultural machinery and implements, exports of which increased to $134 million compared with $117 million for the same period in 1944.

✦ ✦ ✦

EXCLUDED from the export figures are shipments to the United States armed forces abroad, shipments between Continental United States and United States Territories and Possessions, and shipments between the Territories and Possessions. None of the export or import figures have been adjusted for changes in price level. All data have been revised to include revisions released with the September 1945 reports.

TYPE 1A — CAP. 1/16″ TO 3/16″ DIA.

•

STRAIGHTENER SPECIALISTS FOR OVER 80 YEARS

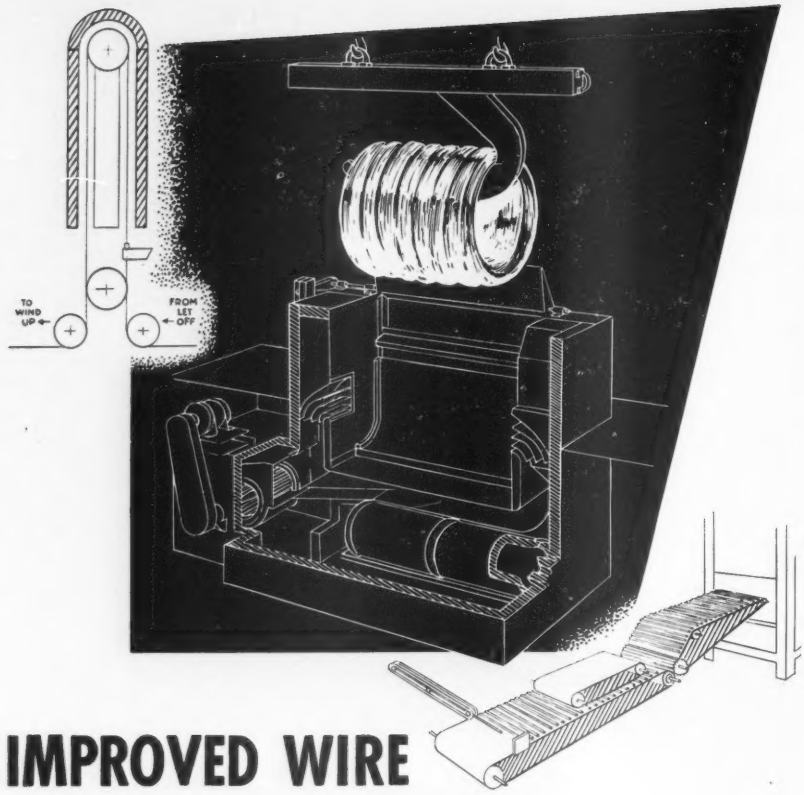
*Some of the refinements developed in that time—*

*Almost continuous wire travel*
*Lightening cut-off that assures square ends*
*High-speed, direct- driven 5-die straightening flier*
*Quiet, efficient V-belt drive*
*Ball & roller bearings thruout*
*Extreme rigidity*
*Types for capacities from 1/32″ to 11/16″ diameter*

DESCRIPTIVE FOLDER SENT ON REQUEST

The F. B. Shuster Mfg. Co., Inc., New Haven, Conn.

SHUSTER
*Automatic*
WIRE STRAIGHTENING AND CUTTING MACHINES
*Since 1866*




# IMPROVED WIRE and LOWER COSTS

Wire technicians have greatly improved the wire processes during the war years resulting in better quality wire and wire coatings. Morrison engineers have kept pace with the advances and added their own innovations that aided greatly in breaking the wire bottleneck during the war. The Morrison techniques have materially lowered the cost of finished wire.

## BAKING

Morrison Flash Bakers have stepped up production and improved drawing characteristics of rod and wire. The Flash Baker produces wire noted for its complete absence of rust and high recovery from acid brittleness.

## ELECTRODE COATING

High speed continuous manufacturing of coated welding rods are benefited by our many years' experience in the development of the complete equipment. Morrison designs the equipment for every step of the way from the moment it leaves the extrusion press to final inspection and boxing.

## DRYING TOWERS

For high di-electric coatings, look into newer impregnants processed with Morrison designed wire drying towers and tanks. Other designs for conventional coatings available, including necessary wind-up and take-off equipment. *Call Henderson 6666.*

**THE MORRISON ENGINEERING CORP.**
5005 Euclid Ave. Cleveland 3, Ohio

Morrison Engineering Co., of Canada, Ltd., Toronto, Ontario. Carrier Engineering Co., Ltd., London, England.

FURNACES
MORRISON
PATENTING
COATING
OVENS
GALVANIZING
IMPREGNATING


## Palladium Takes Place in Jewelry Field

AN old metal has earned a new place in the jewelry field as a result of the war, and apparently will keep it in the years to come.

✦ ✦ ✦

THE metal is palladium, a first cousin of platinum and very similar to its better-known relation. Like all six members of the platinum group of metallic elements, most of the nation's palladium is refined by Baker & Co., Inc., Newark 5, N. J.

✦ ✦ ✦

BEING an element, palladium is as old as the earth. It has been produced as long as platinum, for the two occur together in nature, but the producers didn't know it for many years. Not until 1803 was the existence of palladium as a separate substance discovered.

✦ ✦ ✦

PALLADIUM is a white, non-tarnishing precious metal, heavier and more resistant to some chemicals than platinum. It is also about one-third more costly. Palladium is good enough, and expensive enough, to be sure of a permanent place in the jewelry field.

✦ ✦ ✦

THE other four metals of the platinum group are also white non-tarnishing and costly, but aren't likely to duplicate palladium's Cinderella rise. Iridium, osmium, rhodium, and ruthenium are too hard to be worked readily into rings, bracelets or other trinkets.

✦ ✦ ✦

IRIDIUM is used as an alloy of platinum in most jewelry, the common proportion being 10 per cent. Rhodium is used in plating other metals. The others also are employed in alloys, the combination of osmium and iridium being popular for fountain-pen tips.

**ADVERTISING is a service to a magazine's readers. Methods, materials, and machinery were developed under the stress of war. Both editorial matter and advertisements keep you informed on what is happening in industry.**

# Outstanding Personalities of the Wire Industry

## A. E. Glen Appointed Manager of Die Sales at Carboloy Company

WITH the rapidly increasing interest in carbide dies for all types of metal working, **Carboloy Company, Inc.**, has created a new separate Die Sales Division. **A. E. Glen,** until recently Sales Engineer for Carboloy on special die applications, has been advanced to the position of Manager of the new division, according to an announcement by **K. R. Beardslee,** Vice President in Charge of Sales. In his new capacity, Mr. Glen will head up all sales of Carboloy dies for the deep drawing of sheet metal as well as dies for the drawing of wire, shapes, and tubing.

✦ ✦ ✦

Mr. Glen joined Carboloy in 1928 shortly after the founding of the company, and was responsible for many of the pioneer carbide die installations in wire mills. He is an active member of the Wire Association.

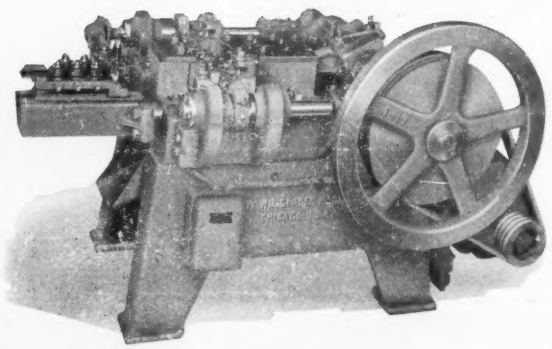
A. E. GLEN, Manager
Die Sales
Carboloy Company, Inc.

## Rustless Makes Personnel Changes

G. D. **Moomaw** has been named general manager of the **Rustless Iron & Steel Division, American Rolling Mill Co.,** and **C. R. Hook Jr.** is assistant to the general manager. **Frank Buffo** has been named manager of stainless bar and wire sales of the Rustless division, with **Peter B. Kline** as assistant manager. Also announced is the formation of the development engineering department headed by **Stanley P. Watkins** and **Thomas L. Moore** as assistant manager. **George W. Clearwater** has been appointed office manager and has been elected assistant treasurer, American Rolling Mill Co. The merger of Rustless Iron & Steel Co. with the American Rolling Mill Co. became effective Jan. 1.

*(Please turn to page 240)*


GLADER HIGH SPEED WIRE NAIL MACHINE



MACHINE ARRANGED FOR INDIVIDUAL MOTOR DRIVE

High tonnage output, and low maintenance costs, have resulted in Glader Machines being accepted as standard equipment in every large nail mill built in the United States in the past twenty years.

Glader Machines are operating in most of the wire producing mills throughout the world.

These machines are made in eleven different types and sizes. This enables us to cover the range of sizes of nails produced with the greatest efficiency.

For further information please address,

WM. GLADER MACHINE WORKS
210 NO. RACINE AVE.
CHICAGO 7, ILLINOIS

## Outstanding Personalities of the Wire Industry

*(Continued from page 239)*

### General Electric Makes Changes in Industrial Heating Division

C. L. Ipsen, manager, Industrial Heating Division, General Electric Co., Schenectady, N. Y., announces the following organization for that division: **R. D. Ketner,** manager of sales, industrial heaters and devices section; **O. S. Haskell,** manager of sales, electric furnace and oven section; **K. E. Kjolseth,** manager of sales, induction and dielectric heating section; and **R. M. Cherry,** assistant manager of the division. The company's Electric Welding Division is organized as follows: **C. I. MacGuffie,** manager; **W. L. Immer,** assistant manager; **W. W. Churchill,** in charge of the equipment group; **H. O. Westendarp Jr.,** electrode group; **B. C. Tracey,** accessory group; **R. F. Wyer,** application engineering group.

### Ralston to Head Roll Sales for Lewis Foundry and Machine Division

The Lewis Foundry and Machine Division of Blaw-Knox Company recently announced the appointment of **A. L. Ralston** as manager of roll sales.

✦ ✦ ✦

Mr. Ralston has been with the Lewis Foundry and Machine Division since 1927, first as salesman, then as assistant manager of roll sales. Previous to that time he had been associated with various steel companies in the Pittsburgh district.

✦ ✦ ✦

### Gustafson Becomes Superintendent of Republic Plant at Gary

Cleo E. Gustafson has been appointed superintendent of the Gary, Ind., plant, Union Drawn Steel Division, **Republic Steel Corp.,** succeeding **George E. Yarnold,** who has been transferred to a similar plant in Los Angeles, recently acquired by Republic.

### Pittsburgh Steel Appoints Dull to Serve Chicago District

Edward L. Dull has been appointed Chicago District Sales Manager for **Pittsburgh Steel Company,** Pittsburgh, Pa., effective Feb. 1, 1946. Mr. Dull began his business career in the operating department of Jones & Loughlin Steel Corp. in 1927, and later was transferred to the sales department. Since 1937 he has been sales representative in the Chicago area for Babcock and Wilcox Tube Company.

✦ ✦ ✦

### Sprague Electric Company Elects Two Vice Presidents

Julian K. Sprague and Dr. Preston Robinson recently were elected vice presidents of the **Sprague Electric Co.,** North Adams, Mass. Mr. Sprague, a member of the board of directors, has been associated with the company since 1926, and Dr. Robinson, also a director, has been with the company since 1929.


# NOT A BETTER DIE---BUT THE BEST!

UNWIDIE

For a quarter of a century the name Union Wire Die has been the wire-mill byword for quality and economy, in the United States and throughout the world.

In the Union tradition, prompt delivery and careful attention to your problems are assured.

**DIAMOND DIES**
**DIAMOND POWDER RECUTTING MACHINERY**

**THE UNION WIRE DIE CORP.**

71 WEST 45th ST.
NEW YORK CITY 19

375 FAIRFIELD AVE.
STAMFORD, CONN.

## North American Philips Changes and Additions

Dr. O. S. Duffendack, President of **Philips Laboratories, Inc.**, recently organized to act as research center for all Philips interests in the United States, has announced the following additions to his staff at Irvington, N. Y.:

**Dr. James G. Black** comes to Philips from the University of Michigan. He recently completed work on an important secret project for the National Defense Research Committee. Dr. Black will be Chief of the Division of Miscellaneous Projects and Analytical Laboratories.

**Carol M. Veronda** comes to Philips from the Naval Research Laboratory, where he was occupied with Radar work. He was employed by General Electric Company before joining the Navy. In his new post he will be Assistant Engineer, Microwave Section.

**Frank Grace** comes to Philips from Reeves Sound Laboratories and will occupy the post of Assistant Engineer, Microwave Section.

**George A. Espersen** has accepted the post of Associate Physicist, Microwave Section. He has been transferred from the Dobbs Ferry, N. Y. plant, where he was Tube Division Engineer.

**Dr. Victor Wouk** recently joined the Engineering Laboratories staff of North American Philips Company, Inc. at Dobbs Ferry, N. Y. Formerly with Westinghouse Electric Corporation, where he was engaged in research on mercury arc rectifiers and gaseous conduction, Dr. Wouk will investigate circuit theory for Philips.

✦ ✦ ✦

## Orville Barton Made Assistant to Manager of General Electric's Plastic Division

**Orville O. Barton** has been made assistant to the manager of the General Electric Co.'s Meriden, Conn., works of the Plastics Div. of the company's Pittsfield plant.

✦ ✦ ✦

## National Gypsum Company Advances Amos B. Miner

**Amos B. Miner** has been appointed manager of industrial sales for National Gypsum Co., Buffalo.

## J. B. Mitchell Appointed Assistant to Vice President of Jones & Laughlin

THE recent naming of **John B. Mitchell** as assistant to the operating vice president, has been announced by the **Jones & Laughlin Steel Corp.**

Mr. Mitchell's entire career has been in the steel industry. He started with J. & L. on Sept. 1, 1915, in the Aliquippa Works Machine Shop, became assistant steam engineer and later superintendent of the 14-inch mill. For the past eight years, he has been superintendent of the rolling mills at the J. & L. Pittsburgh Works.

## Bolt and Nut Company Expands

**Maryland Bolt & Nut Co.**, Baltimore, plans to install additional cold heading and finishing machines, with work to be completed by next September.

**An ADVERTISER likes to know his ads have been read, so please mention WIRE & WIRE PRODUCTS when writing him.**

*(Please turn to page 242)*

**MAKE HUBBARD YOUR SOURCE**
**FOR DRUMS AND TRAVERSES**

Enjoy the benefits of Hubbard engineering skill and production facilities, by making Hubbard your source for Drums or Traverses.

Our Garrett Division can supply all standard sizes, in diameters from 6" to 60", in plain, hot dip galvanized or painted finish. Write today for information on delivery and prices.

**Under license arrangement with Western Electric Company, Inc.*

**HUBBARD SPOOL COMPANY**
1624 CARROLL AVENUE | CHICAGO 12, ILLINOIS
*Since 1912, manufacturers of wire drawing and annealing, and shipping spools and reels.*

PLANTS AT CHICAGO, ILLINOIS AND GARRETT, INDIANA

## Outstanding Personalities of the Wire Industry

*(Continued from page 241)*

### Weldy Appointed Manager of Carboloy Distributor Sales

**J. E. Weldy,** Assistant to the Vice President of **Carboloy Company, Inc.,** for the past three years, has been appointed Manager of Distributor Sales by **K. R. Beardslee,** Vice President of the Company. In his new capacity, Mr. Weldy will supervise directly all sales activities through Carboloy's rapidly expanding distributor organization. A graduate of the University of Minnesota, he joined Carboloy in 1930, being connected successively with the Company's die works in Cleveland, sales organization in the Southern United States, the Western New York District Office and the Cleveland Branch office. He is a member of the A. S. T. E.

### Zeller Joins Aetna-Standard

**Robert M. Zeller,** formerly with the **Carpenter Steel Company** of Reading, Pa., is now associated with the **Aetna-Standard Engineering Company** of Youngstown, Ohio. Mr. Zeller is a roll designer and his capacity in the Roll Sales Division at Aetna-Standard will be that of Roll Engineer.

✦ ✦ ✦

### War Assets Corporation to Handle Surplus Goods Disposal

DESIGNATION of the War Assets Corporation, Reconstruction Finance Corporation Subsidiary, to handle the disposal of surplus consumer goods and capital and producers goods in no way means a change in the already established sales offices, personnel, procedures and policies, it was announced today.

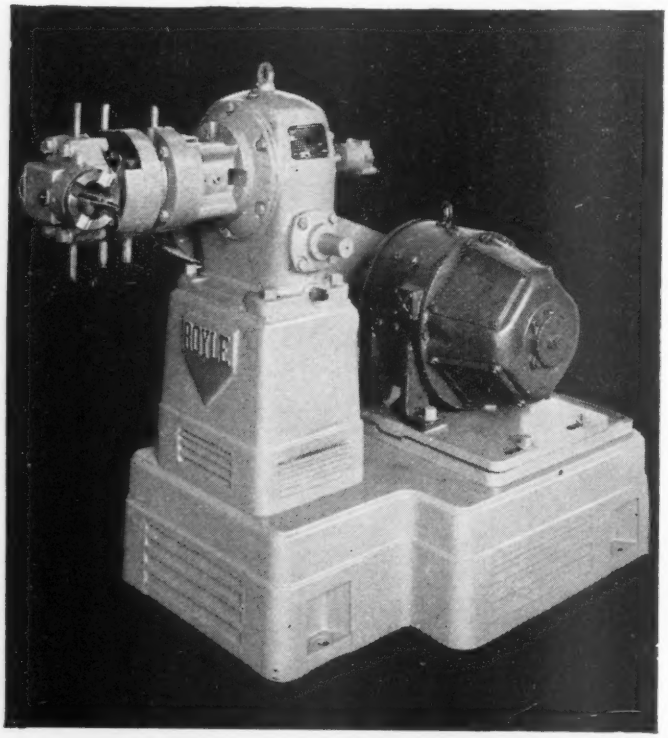
**Lt. General Edmund B. Gregory,** War Assets Corporation Chairman, pointed out that the established offices for such surplus property throughout the nation will still be used and the same policies will be in effect. He asks that purchasers of these types of surplus property continue to do business with the same people and at the same addresses as heretofore."

✦ ✦ ✦

### Haarbauer Goes to Reynolds Wire Co.

**W. E. Haarbauer** has joined the Reynolds Wire Co. at Dixon, Illinois, as General Wire Mill Superintendent. He formerly was with the Townsend Co., New Brighton, Pa., and has had many years experience in the drawing of wire and wire products.

*(Please turn to page 255)*


## Designed for Experimental and Product Extruding

Rugged is the word to describe this compact and highly efficient Royle continuous extruding machine. It embraces all of the characteristics required for larger and heavier extruding processes.

Primarily designed to become an integral part of laboratory equipment (the technician can be sure that his experiments will have true relation to actual product extruding) the Royle #1 is an efficient producer of such commercial products as tubes, fine wire insulation, monofilament and thread coating.

**JOHN ROYLE & SONS**

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

James Day (Machinery) Ltd. London, England REgent 2430

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Los Angeles, Cal. H. M. Royal, Inc. Lafayette 2161

**PATERSON 3, NEW JERSEY**

# A Review of Recent Wire Patents

**Complete Descriptions and Drawings of Patents May Be Had for 25 cents; outside United States and Canada, $1.00. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.**

No. 2,391,931, METHOD OF MANUFACTURING ELECTRICAL CONDUCTORS HAVING A KNITTED PROTECTIVE JACKET, patented January 1, 1946, by Milton D. Swartz, Baltimore, and Kinloch N. Yellott, Cockeysville, Md., assignors to Farboil Paint Company, Inc., Baltimore, Md., a corporation of Maryland.

✦ ✦ ✦

The method provides for a protective knitted jacket about an insulating jacket, enclosing the wire conductor. The two jackets are adhesively united as well as the threads of the knitted jacket.

✦ ✦ ✦

No. 2,391,957, WIRE-DRAWING BLOCK, patented January 1, 1946, by James M. Fenner, South Euclid, and Frank G. Mog, Cleveland, Ohio, assignors to The American Steel and Wire Company of New Jersey, a corporation of New Jersey.

✦ ✦ ✦

More specifically, the invention resides in a multiple speed mechanism for driving the block at any selected speed.

✦ ✦ ✦

No. 2,391,969, APPARATUS FOR PRODUCING CAGE GRIDS, patented January 1, 1946, by Carl Herzog, Belleville, N. J.

A wire guide is moved in an elliptical path, associated with a mandrel having a longitudinal axis of rotation extending longitudinally of the path of the guide, but inclined with respect to the plane of the path, and having wire-holding devices at both ends.

✦ ✦ ✦

No. 2,392,223, METHOD OF MAKING BARBED WIRE STRUCTURES, patented January 1, 1946, by Alan E. Brickman, New Haven, Conn., assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey.

✦ ✦ ✦

This method comprises providing a welded fabric having a number of wires extending in one direction welded to a number of wires extending transversely of these first wires, severing at least one of the transverse wires between the first named wires, and bending the cut wires into substantially V-shaped barbs.

No. 2,392,404, PICKLING BATH FOR FERROUS METALS AND INHIBITOR FOR USE THEREIN, patented January 8, 1946, by Harry L. Peterson, Hohokus, N. J., assignor to Lotte Chemical Company, Inc., Paterson, N. J., a corporation of New Jersey.

✦ ✦ ✦

To prevent the dissolution of the metals in dilute solutions of non-oxidizing mineral acid, this inventor provides the inhibitor comprising a minor proportion by weight of di ortho xenyl thiourea and a major proportion by weight of sodium sulfate.

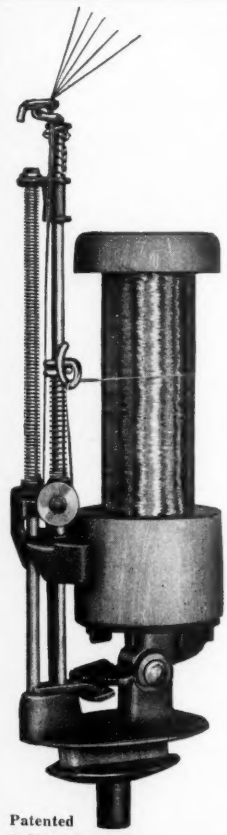
✦ ✦ ✦

No. 2,392,687, APPARATUS FOR ELECTROPLATING WIRE, patented January 8, 1946, by John S. Nachtman, Youngstown, Ohio.

✦ ✦ ✦

The electrode of this wire electroplating apparatus is a rotating tube, through which the wire passes, surrounded with the circulating electroplating fluid. The current passes from the wire through the solution and to the tube.

*(Please turn to page 244)*

Patented
2 BX - Special
MOSSPEED Carrier.

# MOSSPEED BRAIDER CARRIERS
## FOR BRAIDING
## MULTIPLE ENDS OF FINE WIRES

A special design MOSSPEED CARRIER and BOBBIN is supplied for braiding "SHIELDED" WIRE, ETC.

Will braid multiple ends of fine aluminum, brass, bronze or copper wire, etc.

SHEAVE-WHEEL on braider-stop and SPECIAL-THEADEYES on carrier, together with new type BOBBIN provides an even wire "let-off" resulting in a high quality and uniform braided shield.

Consult our engineers regarding your braiding problems

**MOSSBERG**
**Pressed Steel Corp.**

18 West Street
Attleboro, Massachusetts, U. S. A.

European Agent
James Day (Machinery), Ltd., "Ford House," 88 Regent St., London, W. I., England

## A Review of Recent Wire Patents

*(Continued from page 243)*

No. 2,393,024, METHOD OF COATING LEAD SHEATHED CABLE, patented January 15, 1946, by Thomas K. Cox, Randallstown, Alvin N. Gray, Joppa, and Vincent A. Rayburn, Baltimore, Md., assignors to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

✦ ✦ ✦

A wire cable, with the sheath at a temperature in excess of 250° F., has a fine mist of water played thereabout to reduce the temperature to about 250° F., with the mist so regulated that the water is completely vaporized by the heat, and then a spray consisting of a rubber hydrohalide, sulphur and a volatile diluent is applied, followed by cooling water.

✦ ✦ ✦

No. 2,393,037, WINDING SPECIAL CONTINUOUS COILS, patented January 15, 1946, by Frederick D. Fielder, Sharon, and Elmer J. Grimmer, Sharpsville, Pa., assignors to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania.

✦ ✦ ✦

A winding coil is provided comprising a number of disc-type winding coil sections in which the number of full turns of conductor strands per section is unlike for all strands comprising the conductor.

No. 2,393,068, ELECTRODEPOSITION OF INSULATING MATERIALS, patented January 15, 1946, by Samuel Ruben, New Rochelle, N. Y.

✦ ✦ ✦

For insulating a wire conductor which constitutes the anode in an electrophoretic assembly, this inventor proceeds as follows: electrophoretically depositing upon the conductor from an aqueous dispersion, a mixture of finely divided refractory inorganic insulating material, of the class consisting of kaolinite and talc, and an insulating organic binder, the amount of inorganic insulating material being greater than the amount of said organic binder.

✦ ✦ ✦

No. 2,393,363, HEAT TREATMENT OF THIN METAL ARTICLES, patented January 22, 1946 by John D. Gold, and Clarence D. Foulke, Steubenville, Ohio, assignors to National Steel Corporation, a corporation of Delaware.

✦ ✦ ✦

Cold rolled, ferrous metal strips and the like are contacted with a heating medium to initiate recrystallization adjacent the surface, and passed into contact with the cooling medium to control the heat penetration so as to prevent complete recrystallization.

✦ ✦ ✦

No. 2,393,364, EYE BENDING DEVICE, patented January 22, 1946 by Edwin R. Goldfield and Robert J. Stava, University Heights, Ohio, assignors to Picker X-Ray Corporation, Waite Manufacturing Division, Inc., Cleveland, Ohio, a corporation of Ohio.

✦ ✦ ✦

A wire bending device is provided for forming a loop in the end of the wire strand.

✦ ✦ ✦

No. 2,393,548, WINDING MACHINE, patented January 22, 1946 by Robert G. McCoy, New York, N. Y., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York.

✦ ✦ ✦

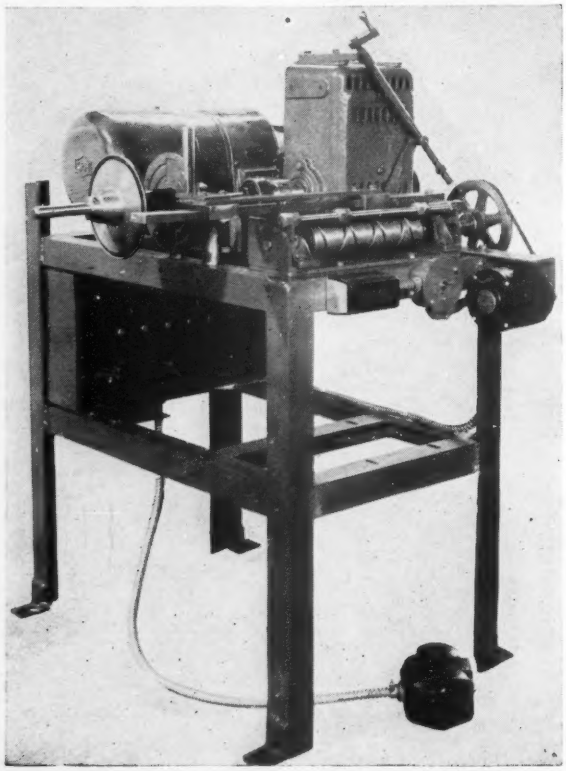
Associated with this wire winding machine is a device to guide the wire to correct positions on the wire support and briefly hold each turn of the positioned wire against slipping from its position.

✦ ✦ ✦

## Aluminum Company Prepares to Meet Demand for Aluminum in 1946

IN a year-end statement, **Roy A. Hunt**, President of the **Aluminum Company of America**, states that with the aluminum production capacity in the United States twice the


# MOTOR DRIVEN VARIABLE SPEED SPOOLER



This machine is designed for spooling non-returnable reels and spools. It will automatically stop at the required footage. When used with a sparker, it will stop at a dielectric fault.

The motor is belt connected to a variable speed transmission with a 16 to 1 ratio. There is an adjustable traverse electrically driven which runs at a constant speed. By varying the speed of the spool it is possible to layer-wind the wire. The motor reverses instantaneously, making it possible to wind the wire level.

The machine is completely equipped with electrical controls which start the motor with reduced torque, release the brakes and run the traverse motor.

*Complete details sent on request.*

**R. L. DAVIS ELECTRIC CO.**

Wallingford, Conn.

total world consumption in 1939, the nation's aluminum industry is putting into effect intensified 1946 sales campaigns to promote the greatest possible use of the metal.

✦ ✦ ✦

ALUMINUM emerged from the war a better metal for many new purposes, and is now available at the lowest price in history. Manufacturers and fabricators plan to take advantage of these conditions to utilize efficiently not only the enlarged production facilities for primary aluminum but the heavy supply of scrap now available. Estimates of the supply of aluminum scrap range from one to three billion pounds.

✦ ✦ ✦

ALCOA looks forward to sharp expansion in its sales force and distributing program. The company has recently opened 11 new regional sales offices and is planning to open 5 more, some in areas where Alcoa previously had no direct sales representation. The company is now selecting qualified men for sales engineering work and preparing them in a thorough training program in its various works. Many of these men are returning servicemen who gained experience with aluminum during the war.

✦ ✦ ✦

AS evidence of the growing acceptance of aluminum for new applications, a trend the industry hopes to accelerate during the coming year, the industry will depend for volume, in part, upon applications comparatively little known till now in a number of the nation's largest industries.

✦ ✦ ✦

THE industry's ability to satisfy all new markets speedily and thus create the greatest possible number of jobs will be influenced by labor and other conditions in consuming industries. While the aluminum industry is a basic industry, any disturbance in the consumers goods fields using aluminum will be immediately reflected in the production and consumption figures of the metal. In order to stabilize the wage situation in all of its operations, our own company recently made available substantial wage increases without price relief but which include a pledge of increased employee productivity.

✦ ✦ ✦

### Brown Instrument Company Installing New Equipment

INSTALLATION of $500,000 in new manufacturing, processing and development equipment, started in 1945, will be completed this year, according to **Henry F. Dever,** president of **Brown Instrument Company,** Philadelphia industrial instrument division of Minneapolis-Honeywell Regulator Company.

✦ ✦ ✦

DURING the past year, said Mr. Dever, the company acquired and installed $250,000 in new and modern machine tool equipment, constituting, he added, part of the recently announced overall expansion plan of the entire Honeywell organization. The Philadelphia division will retain additional branch sites, acquired during war years, it was added, and will make other organizational changes for greater worker comfort and operational efficiency.


# NOTICE TO SUBSCRIBERS

regarding the

WIRE & WIRE PRODUCTS BUYERS GUIDE AND YEAR-BOOK

OF THE WIRE ASSOCIATION

The 1946 Edition of this useful directory may be obtained by subscribers at 40% discount from the list price of $5.00 per copy. So when ordering your subscription to WIRE and WIRE PRODUCTS, if you want a copy of the BUYERS GUIDE, please enclose $3.00, or send the order and ask us to bill you.

Members of The WIRE ASSOCIATION will continue to receive a copy of the BUYERS GUIDE as part of the service extended to them, and the cost is included in the dues.

TO ALL OTHERS THE PRICE REMAINS AS HERETOFORE

$5.00 PER COPY.

THE BUYERS GUIDE is a complete directory of all kinds of wire and wire products manufactured in this country, together with listings of all machinery, equipment, supplies and services used by the Wire Industry.
It is an invaluable source of information on everything of interest to wire men. Be sure to order your copy early to be certain of getting one, as the edition is limited. Published in the Spring annually. Only $3.00 to subscribers.

**WIRE and WIRE PRODUCTS**

300 MAIN STREET STAMFORD, CONN.

## Jewelry of Stainless Steel Unveiled at Metal Show

THERE is something new under the Sun—smart jewelry fashioned from stainless steel.

✦ ✦ ✦

EYEBROWS of scientists, who came to see forging hammers and turret lathes at the Metal Show in Cleveland in February, were raised as they witnessed glamorous models display gleaming bracelets, necklaces, midriff belts, earrings, shoe buckles, and feminine headbands made of the bright alloy usually associated with streamlined trains and automobile trim.

✦ ✦ ✦

SILVERSMITHS who fashion jewelry from precious metals may be in for competition from the metallurgists and the fabricators of stainless steel alloys. The jewelry displayed at the **Rustless Iron and Steel** booth not only out-lustres conventional jewelry, but its surfaces will neither tarnish nor corrode during the lifetime of today's women, nor in the span of the granddaughters she passes it down to.

✦ ✦ ✦

JEWELRY made from stainless steel definitely is a post-war development which spontaneously popped up all over the country during the reconversion of industry from armaments to civilian goods. Evidently a good many ingenious minds hit on the possibilities of this adaptation during the war and now have turned their hands to it for post-war jobs and profits.

✦ ✦ ✦

STAINLESS steel isn't malleable like silver and gold but certain grades are ductile enough to be formed, braided, and twisted easily. It is readily joined by welding. The key to its value for jewelry is the unique method of giving it a high, permanent polish.

✦ ✦ ✦

ELECTROPOLISHING is a process which was developed and patented by the Rustless Research Laboratory in Baltimore for accomplishing a bright surface to complex welded wire shapes of stainless steel which are difficult if not impossible to buff or tumble. Electropolishing is accomplished by dipping the jewelry into a tank containing a warm citric-sulphuric solution and passing an electric current through it. Actually a very thin layer of the metal is removed, leaving a brilliant permanent polish on the surface.

✦ ✦ ✦

HOSIERY has been made of stainless steel, but it is still just a laboratory project. Those who witnessed the exhibition in Cleveland were unanimous in the opinion that the wonder metal has "arrived" in the jewelry field and that it has a promising future.

✦ ✦ ✦

## Carboloy Contacts In Telegraph Relays Reported Giving Excellent Service

ELECTRICAL contacts made of **Carboloy** cemented carbide are reported to be giving materially better service in modern high speed, low amperage telegraph transmis-

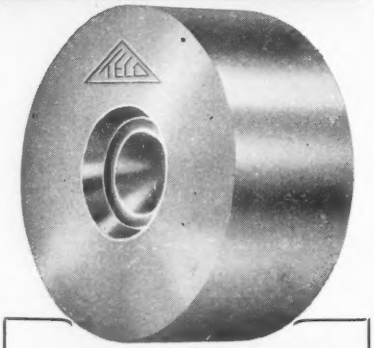
THE PROOF IS IN THE PRODUCTION!

- More Tonnage Per Die
- Less Die Changing
- Smooth, On-Size Finish
- Lower Die Cost

More production! Lower costs! Reports are the same wherever plants use TECO Cemented Carbide. The surest way to learn what TECO Cemented Carbide Dies can do for you, is to run them under your own conditions.

MAKE THIS SIMPLE CHANGE! Just use TECO Cemented Carbide in place of present carbide dies on any wire drawing job. Then compare results with former production.

TECO Cemented Carbide stays on the job longer because it is harder, denser, more uniform — thus has greater resistance to wear and pitting. Outline your operation for recommendation — or have one of our engineers discuss your needs, without obligation.



WIRE and BAR DIES • SIZING DIES
EXTRUDING DIES • TUBING DIES
Carbide Blanks, Tools, Bits,
Reamers, Broaches, Forming Tools

TUNGSTEN ELECTRIC CORPORATION — 564 39th St., Union City, N. J.
Branch Office: 403 Western Reserve Bldg., Cleveland 13, Ohio
Representative: Architects & Builders Bldg., Indianapolis, Ind.

TECO Pioneers in Tungsten Carbides for over a Quarter Century CARBIDE DIES

sion operations than did other metals in the past, including pure platinum, silver, or tungsten or the hard alloy of platinum and iridium.

✦ ✦ ✦

CARBOLOY contacts which have been attached by brazing to the marking and spacing contacts and the armature in this Western Union relay—are self-cleaning. That is, material which becomes loosened through arcing drops away from the carbide instead of fusing to the opposite contact as occurs on contacts made of conventional metals. Thus, Carboloy contacts give long life and freedom from service troubles inasmuch as they do not have to be burnished or cleaned with a file.

✦ ✦ ✦

IN the manufacture of these cemented carbide electrical contacts, tungsten ores carefully selected for purity are used. Grain size is reduced to the smallest particles possible in order to obtain a carbide ideally suited to the electrical requirements.

✦ ✦ ✦

### Michigan Manufacturer Designs Post War Machine to Increase Usefulness of Highway Trucks

DESCRIBED as a better method destined to revolutionize highway freight handling, the "Truc-loader", newly developed product of Clark Tructractor, was introduced recently by Ezra W. Clark to a group of civic and industrial leaders in Battle Creek.

✦ ✦ ✦

A COMPACT, light weight fork truck designed to lift, carry, stack and tier unit package loads weighing up to 1000 pounds, and to operate within narrow limits, the Trucloader is specially adapted for fast, low cost loading and unloading of highway trucks and trailers. It is maneuverable in narrow aisles and has an exceptionally small turning radius of 57 inches. With its light weight it will run safely in and out of trucks and trailers, and can be used in elevators which cannot handle heavier units.

✦ ✦ ✦

### National Research Bureau Announces New Service

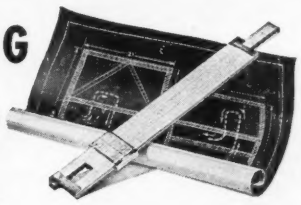
The National Research Bureau, Inc., 415 North Dearborn Street, Chicago 10, Illinois, has just announced a new service for business executives . . . BUSINESS BOOK DIGEST AND INDEX.

THE service contains over 7,000 titles, organized under 108 technical and business classifications. Books are listed and digested on 5" x 8" sheets. Each sheet contains the names of the author, name of the book, name of publisher, the price and a digest of the contents. The service consists of 3,724 pages, and comes in two file boxes. In addition to subject listings, books are also listed by publisher. The books of all leader publishers of technical and business subjects are listed. It is kept up to date through supplements issued throughout the year.

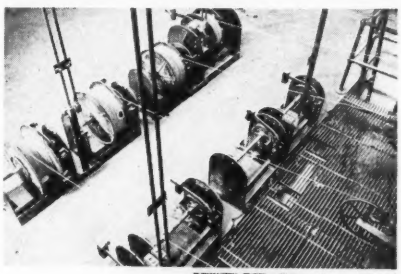
### Correction

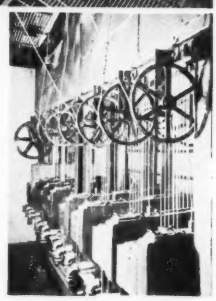
WE greatly regret that through error, the company connection of J. P. C. McMath, author of the article and accompanying chart—"A Universal Taping and Braiding Chart"—that appeared in our February, 1946, issue, was not stated correctly. Mr. McMath's connection is the Northern Electric Company, Ltd., Montreal, Canada.


## OVEN ENGINEERING NEWS



**Wire speeds through this Lacquer System at 72,000 feet per hour; Production rates increase 25%.**





**Above — Here are the controlled-tension payoff stands for an eight-end wire and cable lacquering system which was designed, built and installed by the Industrial Oven Engineering Company. Lacquer pots are shown at right.**

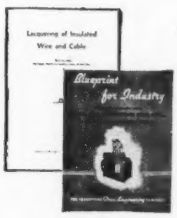
"Our Industrial Oven wire and cable lacquering system has stepped up our finishing speed 25 per cent while reducing our labor cost for this operation approximately 30 per cent."

These are the words of E. W. Gundstrom, Chief Engineer of The Rome Cable Corporation of Rome, New York. This company uses its IOE system to bake lacquer finishes on radio hook-up wire and ignition cable ranging in diameter from .070" to .600" OD, simultaneously applying one saturating coat and 11 lacquer coats. The full range of equipment includes wire from .010" to .750".

Operating 24 hours a day, six days a week, Rome Cable has enjoyed satisfactory continuous operation with down time for maintenance and repairs a negligible factor.

"We have made a great improvement in the quality of the finish with our IOE equipment," said Mr. Gundstrom. All IOE oven processing units are supplied with the most complete and modern automatic control systems, installed and field wired by our engineers. IOE lacquer towers are explosion proof whether heated by electricity, gas, oil or steam.

### HOW DO THEY WORK?




**The operation of IOE systems such as the one at Rome Cable, is described in our 16-page reprint of a Wire and Wire Products article. A copy will be sent to you on request.**

*(This is No. 23 of a series. Reprints of previous advertisements sent free upon request.)*

IOE ENGINEERING VERSATILITY

THE INDUSTRIAL Oven Engineering COMPANY

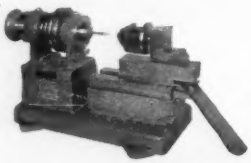
13825 TRISKETT ROAD, CLEVELAND 11, OHIO

*Engineering Representatives in Principal Industrial Areas*

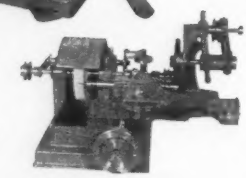
★ ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON, W. 1, ENGLAND ★

**NEW DIE ROOM FINISHING MACHINERY DIE ROOM TOOLS and EQUIPMENT**

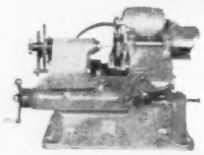
For speeding up production of Tungsten Carbide Dies and making lapping pins faster and with regular die room help. No special skill required.



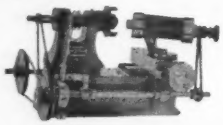
NEW DYRO PIN MAKER



NEW ROOS PIN GRINDER



NEW PARK PIN GRINDER



ROOS PRECISION GRINDER

**All sizes LAPPING PINS**
Prompt shipment on orders of 1 to 1,000.

**And New PIN GAUGE**
for fast checking pin sizes.
Write for details.

**SEND FOR NEW CATALOGUE DESCRIBING LATEST ROOS EQUIPMENT FOR WIRE DIE FINISHING MACHINERY**

ROOS TOOL & MFG. COMPANY
*Plant and Shipping Point*
17 Grove Street, Montclair, N. J
*Sales Office*
49 Bloomfield Avenue, Newark 4, N J


## New Bulletin on "Surface" Radiant Tube Heating

"SURFACE" Radiant Tube heating is described in new 4-page bulletin No. SC-128, just issued by **Surface Combustion Corp.**, Toledo 1, Ohio. Application of radiant tubes to various types of heat treatments and processes is covered, which, besides finished parts, includes strip, coil, tube, rod, wire and bar stock.

✦ ✦ ✦

USED in both ferrous and non-ferrous metal processing, the bulletin brings out the greater flexibility, economies, and other distinct advantages of this heating method when applied to carburizing, carbon restoration (skin recovery), hardening, annealing, etc., in which prepared atmospheres are used to produce clean or bright work.

✦ ✦ ✦

THE bulletin shows a schematic view of a radiant tube and includes illustrations of some of the types of furnaces in which its use is advantageous. Also included is a chart giving the available heat of artificial, natural, propane and butane gases.

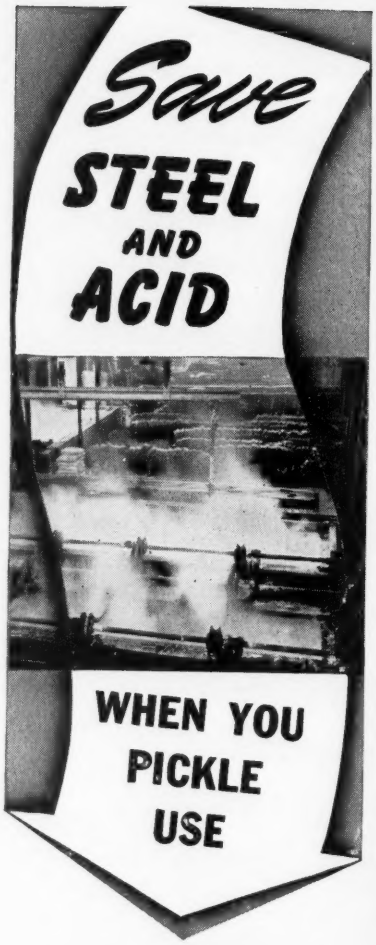
✦ ✦ ✦

## Change in Date for A.G.A. Conference

THE **A.G.A.** Conference on Industrial and Commercial Gas, originally scheduled in Toledo for Thursday and Friday, March 28 and 29, has been moved one day to Friday and Saturday, March 29 and 30. It will be held at the same location, the Commodore Perry Hotel.

✦ ✦ ✦

A FULL program has been prepared for the two-day conference which will include informative addresses and papers on: Prepared Atmospheres, LP Gas Standby, Heating for Plastics Processing, Commercial Water Heaters and Boilers, The Industrial and Commercial Engineer's Opportunities, High Speed Direct Heating, and many others of vital interest to all gas men.


**Rodine**

CHEMICALS ACP PROCESSES

**RODINE inhibited acid baths remove scale without dissolving clean metal—less acid is consumed. A better finished surface is produced.**

**Our Technical Department will gladly assist in adapting ACP Products and Processes to your manufacturing requirements. Address Dept. D-3.**

American Chemical Paint Co.
AMBLER ACP PENNA.

## Silicone Varnish Used in Coils for Heavy Equipment

THE **National Electric Coil Company** of Columbus, Ohio, is making an interesting use of Silicone varnish in their Silicone mica-glas coils, used in heavy rotating machinery.

✦ ✦ ✦

SUCH coils are constructed of four basic materials—fiberglas, mica, Silicone varnish and melamine bonded glass laminates. The coils may be wound with magnet wire that has been previously insulated with fiberglas and treated with Silicone varnish.

✦ ✦ ✦

THE machine for carrying out this operation is one made for the National Electric Coil Company by the American Insulating Machinery Company of Philadelphia, a machine which will also produce the standard fiberglas insulated wire treated with the conventional varnish.

✦ ✦ ✦

THE balance of the insulation done to complete the coil normally consists of a combination of mica, bonded to glass cloth with Silicone for the ground insulation and an outside binding tape of fiberglas, also impregnated with Silicone, the high heat resisting qualities of which, give the insulations described unusual characteristics under continuous and severe operating conditions.

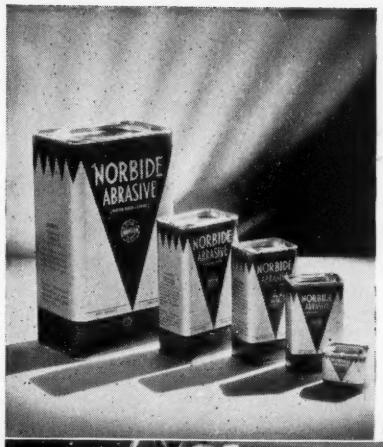
✦ ✦ ✦

## Motion Picture On Swaging

**Standard Machinery Company,** Providence, 7, R. I., has completed and is making available for group showings, a twenty-six minute, 16mm. motion picture designed for tool engineers, employee groups, etc., entitled "Swaging".

✦ ✦ ✦

DESIGNED to portray the many applications of swaging to today's mass production method, where pointing, shaping, attaching fittings to bars, cables and tubes and other similar operations may be performed on steel, stainless steel, copper, aluminum and other metals. A booklet describing it may be obtained upon request.

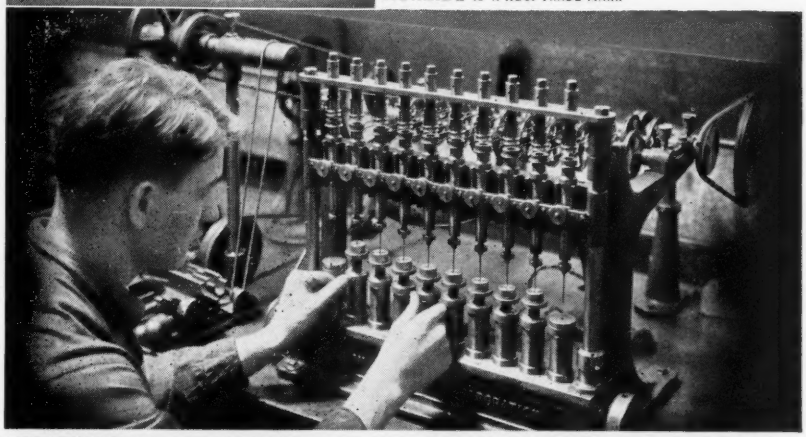




**NORBIDE Abrasive Cuts Costs 100%**

NORBIDE Abrasive is extensively used as a successful medium for cutting and semi-finishing cemented carbide wire drawing dies. NORBIDE is second only to the diamond in hardness, yet this abrasive costs but one hundredth as much. Sizes 220 and 240 are recommended for ripping operations, 320F for a semi-polish, 500 to 800 for final finishing.

**NORTON COMPANY**
Worcester 6, Massachusetts

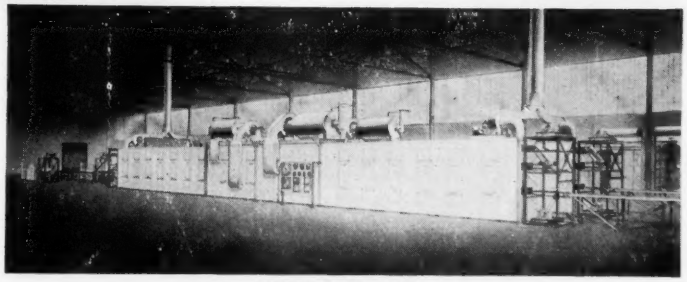
NORBIDE IS A REG. TRADE MARK



**MORE PRODUCTION IN LESS TIME with CARL-MAYER FURNACES, OVENS**

CARL-MAYER HI-SPEED
**ROD BAKER**

The fastest rod baker built! Saves up to 50% in time and fuel. Patented Blow-Off Feature removes moisture without bumping or agitating the coils. **Patented and patents pending.**



WELDING ROD OVEN

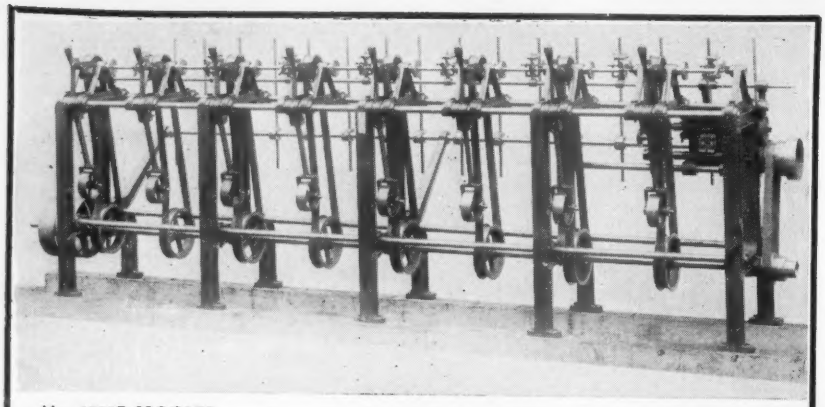
For drying coated welding rods. Uses the "Mayer" Recirculating Gas Fired Air Heater principle and Rod Transfer Systems (patents pending).

**Growing interest in our type of equipment is evidenced by Carl-Mayer installations in such plants as:—**

Atlantic Wire Co.
Atlas Tack Corp.
Atlas Steel Co.
Eaton Mfg. Co.
Hollup Corp.
Johnson & Nephew Ltd.
Page Steel & Wire Co.
Pittsburgh Tool Steel Wire Co.
Steel Co. of Canada
Wickwire Spencer Steel Co.

WRITE for BULLETIN No. 211

**THE CARL-MAYER CORPORATION** 3030 EUCLID AVENUE CLEVELAND, OHIO



No. 1900E SPOOLER

**WIRE SPOOLING MACHINES**

Model illustrated takes spools up to 12" diameter. Floor space required: 19" x 10'; length can be varied to suit largest spool specified. Handles wire up to .050" diameter. Other models made to suit specific requirements.

EMORY SPOOLERS are built for years of continuous service. Precision made, durable, rugged, dependable.

BUILDERS OF WIRE SPOOLING MACHINERY for A HALF CENTURY

For details, write to

**ROBERT J. EMORY COMPANY**

31 East Runyon Street
NEWARK 5, N. J.
Telephone Bigelow 3-4415

**TUNGSTEN CARBIDE DIES for HEADING and**

WIRE AND TUBE DRAWING (.030" to 2"), EXTRUSION (1/16" to 1"), RECUTTING AND WELDING ELECTRODE COATING.

RING GAUGES
DIAMOND DIES (.0015" up)
DIAMOND POWDER IN ALL GRADES

**AIRCRAFT EXTRUSION DIES**

As a special service to customers, we are prepared to give three day service on standard wire, tube and extrusion dies in cases of extreme urgency.

Address Inquiries to

**MICHIGAN WIRE DIE CO.**

11152 Chalmers Avenue
DETROIT 5, MICH.

Telephone:
PINGREE 5702

## Wire Association Announces Spring Activities

PLANS for the Spring activities of the Wire Association are now in the process of completion and all members are urged to arrange to attend these meetings.

✦ ✦ ✦

THE Annual Directors Meeting and Election of Officers will be held at the Waldorf-Astoria Hotel in New York City on Friday, March 29th. As is customary, the Directors Meeting will be followed by a luncheon and an interesting program, to which all Association members are invited.

✦ ✦ ✦

REGIONAL Meetings have been arranged for, to be held at Springfield, Mass. and San Francisco, Calif. Both will be dinner meetings. The Springfield meeting will be held at the Hotel Kimball on Friday, May 3rd, with Mr. **J. A. McGreevy,** Vice President, **Apco Mossberg Company,** Attleboro, Mass., as Chairman; and the San Francisco meeting will be held at the Sir Francis Drake Hotel on Friday, June 7th, with Mr. **Earl R. Potter** of **Industrial Wire Products Company,** San Francisco, Calif., as Chairman. For this meeting Mr. **Wallace G. Imhoff,** nationally known authority on galvanizing, will present a very thorough discussion on various inhibitors and their applications.

✦ ✦ ✦

## Bakelite Offers Booklet On Vinylite

"VINYLITE Plastics—Elastomeric Compounds" is the title of a new booklet published by the Bakelite Corporation, 300 Madison Ave., New York 17, N. Y., which shows how these compounds have improved already established applications or made possible new ones. This illustrated 19-page booklet discusses molding and extrusion compounds, flexible sheeting and film, cloth coating compounds, and describes the properties which have made these plastics valuable engineering materials.

✦ ✦ ✦

COPIES of the booklet are available upon request.

## Wire Association—Questions and Answers

*(Continued from page 234)*

good sturdy position with no play whatsoever. Then there would be no reason why the threads should not come out in proper order.

May I also suggest for you to look into the lead screw which governs the travel of either your rollers or stock. If there is any back-lash in the lead screw that would also give you rough threads. If your rollers are not properly hardened and ground with no scratches in it whatsoever, I would suggest chrome plating and then ground to size. That also should help.

I suggest you check the above and we would be interested in your findings. If you should still have trouble, I would appreciate it if you would send us a small piece of your product for our inspection, so that we can check further into the matter and try to locate the difficulty."

✦ ✦ ✦

### Answer #2

"We do have a suggestion. One is to use a single die, tooled to cut double threads. If you refer this letter to the Wisconsin Tool & Die Company, 1912 West Lake Street, Chicago 12, Illinois, we believe they may be in a position to take care of this inquiry. We have also forwarded this letter to R. & M. Engineering Company, Passaic, N. J., who we understand specialize in thread rolling and who may be able to help you."

✦ ✦ ✦

## Carboloy Devises New Container for Packaging Standard Dies

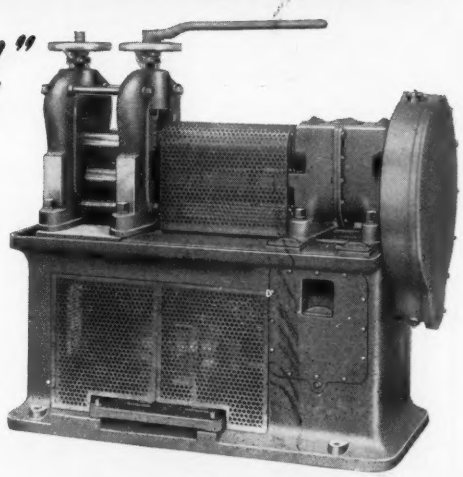
CARBOLOY wire drawing dies are now so widely used in industry that **Carboloy Company, Inc.**, Detroit, Michigan, is now packaging all dies from R-1 through R-5 as stock items in quantities of ten in strong cardboard cylinders having a waxed interlining which effectively protects the dies from moisture. A sticker on the lid of each carton carries such pertinent information as nib size, casing size, and hole size of the dies. Packaging dies in these cases in quantities of ten not only shortens the time required to fill orders for standard dies in the smaller sizes and insures stock arriving in first class condition, but also adds to the neatness of the user's stock room and materially speeds up spot inventories. There are several sizes of these specially designed cartons to accommodate the various standard wire drawing dies.


JOHNSON *Wire*

Every coil of Johnson Music Wire is tested by winding several coil springs from wire taken from each end of the coil. Springs must show uniform pitch when stretched to 3 or 4 times normal length. Test springs are attached to each end of the coil you receive. Here is one of the many reasons for the individuality of Johnson's XLO Music Wire.

JOHNSON STEEL & WIRE CO., INC.
WORCESTER 1, MASSACHUSETTS
NEW YORK AKRON DETROIT CHICAGO LOS ANGELES TORONTO

*"Standard"*
FINISHING MILL
ROLLS GOLD, SILVER PLATINUM & SPECIAL ALLOYS TO A MIRROR FINISH



This precision rolling mill is equipped throughout with lapped herringbone gears running in a bath of oil. The couplings are of Universal ball type and the rolls are mounted on fully enclosed roller bearings, with a double ball thrust to prevent any side motion of the rolls and eliminate friction on the inside of the roll boxes. The rolls are mirror lapped and will roll gold to close tolerances without shadows or marks of any kind.
Available in two sizes, 4" x 6" and 5" x 8". With variable speed motor, this mill can be arranged with payoff and takeup.

SEND FOR BULLETIN RM

STANDARD MACHINERY CO.
Providence 7, R. I.

## New Data on Weather-Stripping Method

**The Fairchild Camera & Instrument Corp.,** Jamaica, N. Y., which a year ago announced a method for removing insulation from fine electrical wires, has reported the method's success far exceeds original claims made for it.

✦ ✦ ✦

IN production, the use of this method has enabled electrical manufacturers to strip all modern types of synthetic covered wires. These include Formex and Formvar wire, in sizes up to No. 55, as well as wire covered with enamels, nylon coverings (extruded and nylon enamels), and other synthetics. Originally, conservative claims for the process mainly applied to Formex and Formvar covered wires in sizes No. 36 to No. 44.

✦ ✦ ✦

THE method is one whereby ends of fine wire to be stripped of synthetic insulation are first quickly dipped in one chemical solution, followed immediately by a second dipping in a final solution that acts as an accelerator. Then, by gently stroking the wire with two fingers of one hand, the operator completely removes the wire's insulation. The entire procedure takes a few seconds. It has been found to be nontoxic to the employee, and in no way chemically harmful to the wire or the finished product.

IT has been determined the method can be successfully applied to every fine electrical wire, and is of particular interest to manufacturers of electrical and electronic products, including radios, radar, television sets, electrical household appliances, fractional horsepower motors, hearing aids, recorder and playback systems, etc.

✦ ✦ ✦

IT is well known that rejects on fine wire stripped through usual hand-scraping methods are high and costly. Added to this, manufacturers have trouble maintaining original engineering specifications on wire used in delicate instruments. As an example, No. 44 wire, when hand-scraped, is often nicked or sanded down, so that it ends up as possibly size No. 46 or No. 48; then the engineer's original design theory is upset and the planned current capacity of a circuit is unknowingly reduced.

✦ ✦ ✦

THIS "Dip-n-Strip" Method produces no change in wire size and physical properties. In production, it is said to have resulted in an 80 per cent saving over and above former production costs in instrument manufacture.

✦ ✦ ✦

THE Company has patented the stripping process and is licensing electrical manufacturers to use it.

## Gravity Roller Conveyors

FOR the first time by any other conveyor manufacturer, **Lyon Metal Products, Inc.,** Aurora, Ill., is marketing a completely "packaged" line of gravity roller conveyors—a brand new product—designed with traditional craftsmanship.

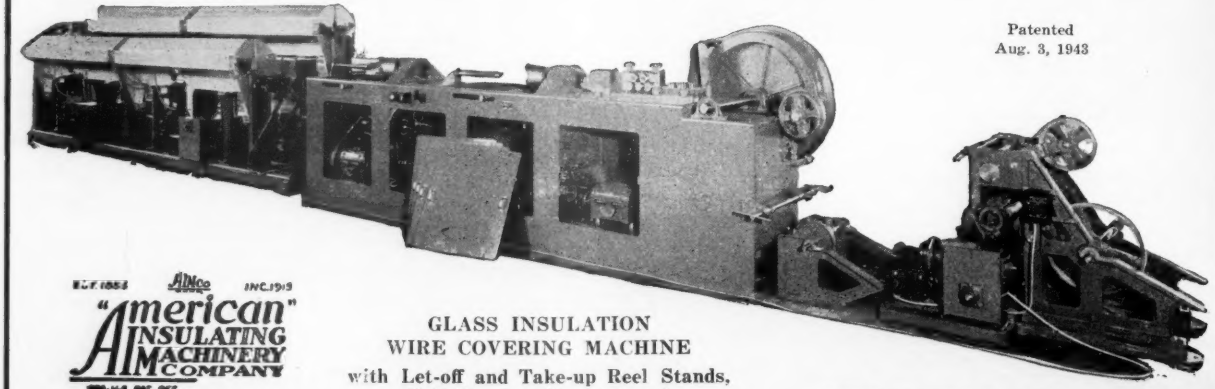
✦ ✦ ✦

THESE conveyors have a large number of industrial uses for the handling and transportation of cartons, bales, packages, boxes, crates and a great many other types of articles and merchandise. They are presently available in these sizes: three straight sections, all 10′ long and in three widths, 12″, 18″ and 24″; three 90 deg. curved sections, 12″, 18″ and 24″ wide; two trestles 18″ and 24″ wide. Each item is a complete unit, packaged and priced per each, simplifying selling, ordering and stocking.

✦ ✦ ✦

## Furnace Manufacturer Moves To New Quarters

**The Stewart Industrial Furnace Division** of the **Chicago Flexible Shaft Company,** manufacturers of industrial furnaces, many of which have found their way into the wire industry, has been separated from the parent company and will hereafter be domiciled at 4433 Ogden Avenue in Chicago.

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Aug. 3, 1943

"American" INSULATING MACHINERY COMPANY
517 West Huntingdon St.
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PHILADELPHIA PENNSYLVANIA USA

GLASS INSULATION
WIRE COVERING MACHINE
with Let-off and Take-up Reel Stands, Ball Bearing Mounted and Variable Speed Motor Drive, Baking Ovens with Two Coat Varnish Applicators, and Individual Automatic Temperature Controllers.

WIRE MACHINES FOR
Drawing, Enameling, Tinning, Spooling, Insulating with Glass, Asbestos, Paper Tape, Cotton, etc. Multiple Pullouts, Rubber covered wire Panners, etc.

## The Crum Calculator For Wire Drafting

*(Continued from page 223)*

drafts the mid-point .0245 would have been set on the 7th instead of the 8th curve. For the odd numbers of draft 9, 11, 13, and 15, the easiest method is the "cut and try" in which different percentages draft per hole are used until the correct one is arrived at.

✦ ✦ ✦

### Double Decking

**Example 7.**

THE diameter of the finishing block of a double-deck wire drawing machine is twenty-four inches; the diameter of the first block, seventeen inches. The operator wishes to finish .142 inch diameter wire from No. 5 rod and therefore must determine (a) the minimum draft for the finished die, (b) the minimum first die size, (c) and the first die size when a slippage of ten per cent is allowed.

✦ ✦ ✦

**Solution 7.**

(a) Disregarding the decimal points, set .24 opposite "START". Swing the dial until .17 is cut by the second (2nd) curve. On the "P.D.H." scale read 29 per cent, the minimum draft for the finished die.

(b) Holding the 29 per cent position, rotate the dial until .142 is cut by the 2nd curve. Now read the intersection of the first curve with the dial—.170, the minimum first die size.

(c) In order to allow 10 per cent slippage on the first block add ten per cent to the finishing block diameter before starting the calculation. Then using 26.4 as the diameter and proceeding in the same manner as above the finishing draft will be 36 per cent and the first die size .178.

✦ ✦ ✦

### Other Problems

ALTHOUGH the seven examples above are the most common problems encountered in the wire drawing process, they are by no means the only ones capable of so-

*(Please turn to page 254)*


"Steelskin Brands"

Reg. U. S. Pat. Office

WIRE, TUBING, STAMPING, DEEP DRAWING SOAPS AND COMPOUNDS

For TIRE BEAD WIRE — Investigate "Steelskin" WR Coating Compound and "Steelskin" SS Wire Drawing Powder

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Established 35 Years

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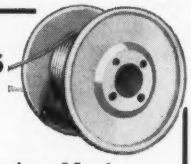

Standard Equipment for Higher Winding Speeds

Apco Mossberg Steel Reels are standard throughout the wire industry – and for good reason! Apco Mossberg – the original Frank Mossberg Co. – *originated* the steel reel idea and have been training workmen in their manufacture ever since. That is why Apco Mossberg Steel Reels are preferred where production schedules are heaviest.

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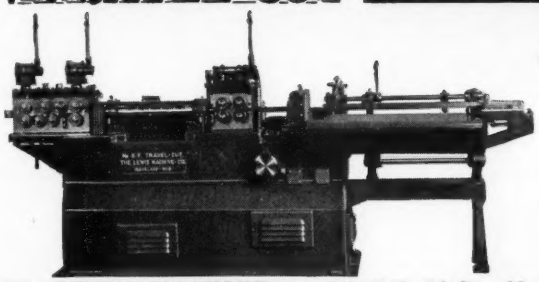

Machines for 1/16" to ¾" rod

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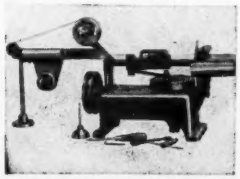

Bench Type Butt Welder

Spot Welder

CHARLES EISLER

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WIRE CUTTING
MADE EASY

Hard wire*, spring wire, as well as soft wire, wire fabric, tie wire, fencing, etc. — easily and quickly cut with a porter tool. A standard model for average needs. Special models for special work.

Send for catalog showing all Porter models of wire cutters, bolt clippers, etc.

*(with center cut round edge jaws)

H. K. PORTER, INC.
EVERETT 49, MASS., U.S.A.

PORTER HKP CUTTERS


## The Crum Calculator For Wire Drafting

*(Continued from page 253)*

lution by the Crum Calculator. As the user becomes familiar with the operation of the device he will appreciate its versatility and adapt it to his local problems.

✦ ✦ ✦

FOR instance, continuous machines with fixed gear ratios which require a different percentage reduction for each hole cannot be set up by using the equi-draft curves. However, for any one set of drafts, a segment of the diameter circle can be drawn on the draft-curve circle and the various drafts can be marked in the appropriate places on the scale to furnish a permanent, quick method of setting up the machine.

✦ ✦ ✦

OTHER problems involving the roots and powers of numbers can also be solved by use of the calculator.

✦ ✦ ✦

### Summary

FROM numerous designs made by the Author during the past several years, this calculator has been selected because of these superior features:

(1) Simplicity of Operation: Most anyone in the mill can learn in a few minutes to solve the most involved problems. Most problems are solved in one setting.

(2) Compactness: A model small enough to be carried in the vest pocket is accurate enough for most mill conditions.

(3) Universality: Because of the circular scale there are neither upper nor lower limits on the diameters that the calculator can be used for.

(4) Versatility: Practically all of the common wire mill problems can be solved on this one device.

(5) Since all diameters are in decimal inches there is no confusion over gauge numbers.

(6) Diameters in the Metric as well as the English System can be used.

✦ ✦ ✦

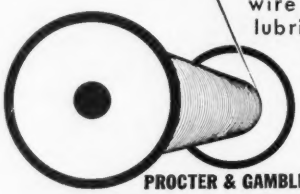
TO Superintendents, Foremen, Metallurgists, Scheduling and Planning Men, Die Room Men, Wire Drawers, and busy men everywhere, this calculator is dedicated.


FOR MAXIMUM "MILEAGE" AND FINISH CONTROL IN YOUR WIRE DRAWING OPERATIONS USE P&G SOAPS

For drawing both ferrous and alloy wires—in either dry or wet operations — you can depend upon these important qualities in Procter & Gamble soaps:

**Excellent Adherence**
**Efficient Lubrication**
**Minimum Dusting**
**Uniformity**
**Economy**

One of our representatives will be glad to discuss wire drawing lubricants with you.



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Increase Die Life
150 to 300 Percent

You can increase die life 150 to 300 percent by using the Oakite Crys-Coat Process to undercoat high carbon rod before liming. Better wire and increased, uninterrupted production are assured by the extraordinary lubricating qualities of this newly developed process. You will find, too, that re-cleaning and re-coating are minimized because rods treated with this new process acquire a fine crystalline phosphate coating which serves to retard rust. Write TODAY for FREE Service Report containing necessary technical data . . . ask for free in-plant tests. No obligation.

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WILLEY'S METAL

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**BETTER DIES**

*Catalog on Request*

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MANUFACTURERS AND SPECIALISTS IN
TUNGSTEN CARBIDE TOOLS
1340 W. VERNOR HIGHWAY • DETROIT, MICHIGAN

## Outstanding Personalities of the Wire Industry

*(Continued from page 242)*

### Northen Takes Over Sales For Sheffield Steel

**Russell Hunt,** vice president in charge of sales, Sloss-Sheffield Steel & Iron Co., Birmingham, is retiring Feb. 1. He will be succeeded by **Charles Northen** who joined the company in May, 1945 as sales manager. Mr. Hunt started with Sloss-Sheffield in 1898 as an office boy and clerk.

### Electric Furnace Company Announces Promotions

THE Electric Furnace Company, Salem, Ohio, announces that **K. U. Wirtz,** formerly Asst. Secretary, has been promoted to the position of Executive Vice President.

✦ ✦ ✦

Mr. Wirtz, a graduate of The Case School of Applied Science, joined The Electric Furnace Company organization in 1927 as an erection engineer. He served in various capacities including Chief Estimator and Sales Engineer before being advanced to Asst. Secretary in 1935.

✦ ✦ ✦

Mr. **C. D. West,** Vice President, who has been connected with the company since 1930 and who has contributed largely to the development of both electric and fuel fired special atmosphere equipment, now assumes complete charge of all sales and sales engineering.

✦ ✦ ✦

Mr. **C. H. Vaughan,** a graduate of the Cincinnati School of Engineering, who also joined the company as an erection engineer and has served the company in various capacities, now becomes Asst. Vice President of the company.

✦ ✦ ✦

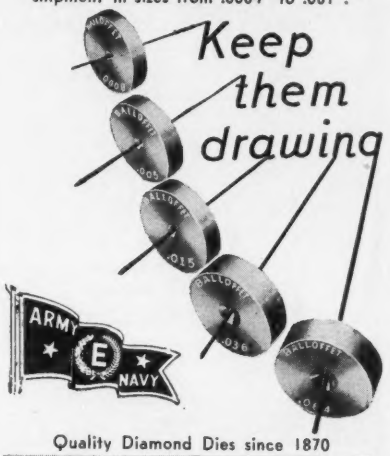
OTHER officers of The Electric Furnace Company are as follows:

**R. F. Benzinger—President**
**F. T. Cope—Treasurer**
**R. D. Painter—Secretary.**

*(Please turn to page 256)*

Balloffet
DIAMOND DIES

Large stock on hand of domestic and imported dies available for immediate shipment in sizes from .0004" to .081".




Quality Diamond Dies since 1870

BALLOFFET DIES AND NOZZLE CO., INC.
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NOW IN STOCK
French Diamond Dies
IN CAPILLARY SIZES
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Famous Wire Drawing Diamond Dies

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| .0004 | .001 |
| .00045 | .0011 |
| .0005 | .0012 |
| .00055 | .0013 |
| .0006 | .0014 |
| .00065 | .0015 |
| .0007 | .0016 |
| .00075 | .0017 |
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.0004 to .072 in stock for quick delivery.

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Better Dies for Better Wire

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## Outstanding Personalities of the Wire Industry

*(Continued from page 255)*

### Allan Brown Becomes Vice President of Union Carbide & Carbon Corporation

**J. W. McLaughlin,** President of **Bakelite Corporation,** a Unit of **Union Carbide and Carbon Corporation,** has announced the election of **Allan Brown** as Vice President in charge of Advertising and Public Relations and **George C. Miller** as Vice President and General Sales Manager, Thermoplastic Department.

✦ ✦ ✦

EFFECTIVE immediately, these appointments tie in with Bakelite Corporation's plans for an extended sales, promotional and advertising campaign on a national basis covering Bakelite and "Vinylite" plastics produced and marketed by the Corporation.

✦ ✦ ✦

THE varied applications of "Vinylite" plastics include a wide range of merchandise. In ready-to-wear, for example, "Vinylite" plastics have already been made into raincoats, umbrellas, millinery, shoes, handbags, aprons, baby pants, men's belts, suspenders and wallets. In the home furnishing field, uses for these versatile plastics range from flooring to drapery materials, kitchen and bathroom tiles, shower curtains, garment bags and bowl covers.

✦ ✦ ✦

**Rickard and Company** is the agency for the technical advertising. **J. M. Mathes, Inc.** handles the consumer advertising, merchandising and publicity.

## Reliance Electric & Engineering Co. Announces Appointments

**Edward E. Helm,** general sales manager of **The Reliance Electric & Engineering Company,** has been elected sales vice president of the company, it was announced recently by **J. W. Corey,** president, following the regular meeting of the board of directors. All other officers were re-elected.

✦ ✦ ✦

HELM has been with Reliance since he graduated in electrochemical engineering from Pennsylvania State College in 1924. Subsequently, he managed both the Birmingham and Philadelphia sales territories, where he was particularly active in application engineering work in the steel, textile and paper industries. His appointment as general sales manager of the company was made in December, 1944.

✦ ✦ ✦

HELM is a member of the Association of Iron & Steel Engineers, the Engineers' Society of Pennsylvania and the Technical Association of the Pulp and Paper Industry.

✦ ✦ ✦

### G. M. Chandler Advanced

**G. M. Chandler,** Carboloy Company Sales Engineer in the Chicago District since 1937, has been appointed Assistant to the Vice President in Charge of Sales. In his new capacity, Chandler—who has been with **Carboloy Company** for the past ten years—will devote a major part of his time to sales analysis and market research work in the fields of carbide tools, dies, and wear resistant parts.

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WIRE - SHAPE - TUBING
EXTRUSION - HEADING
DIES
ALSO TOOL & WEAR RESISTING PARTS
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*Designers and Builders*
SPRING COILERS
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TORRINGTON
SPRING COILERS
14 models in both segment and clutch types for rapid, automatic, accurate production using wire diameters .003" to .750". Torsion and other attachments available for increasing utility of Torrington Coilers.
The TORRINGTON MANUFACTURING CO.
TORRINGTON, CONNECTICUT

Annealing Pots and Boxes
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**National Annealing Box Co.**
Established 1895
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Designers and Builders of Gas-Fired Heat Treating Furnaces for Ferrous and Non-Ferrous Wire.
**SURFACE COMBUSTION CORP.**
Main Plant & General Offices-Toledo, Ohio

SPECIALISTS IN
**DRAWING COMPOUNDS**
and
**SOAP POWDERS**
for
WIRE DRAWING
**NEIL C. POTTER**
24 COMMERCE ST.
NEWARK 2, N. J.

## North American Philips Announces New X-Ray Scanner

AN X-ray scanner, a new industrial accessory developed for use with Searchray 150 X-ray units, has been announced by **North American Philips Company, Inc.**, 100 East 42nd Street, New York 17, N. Y.

✦ ✦ ✦

THE new scanner overcomes distortion and displacement that is present in all conventional methods of X-ray image recording. X-rays cannot be focussed (as with light) to give a parallel beam. Emitted by the tube's anode, the rays diverge to produce inaccuracies of greater or lesser degree, depending on the relationship of the particular film area to the X-ray source.

✦ ✦ ✦

THE scanner unit measures 32" length, 14" width, 16" height and consists of a motor-driven table on which the specimen and film move beneath an adjustable slit through which the X-rays pass. Table speed is ½ to 1½" per minute and can be adjusted to suit each particular application.

✦ ✦ ✦

THE scanner is especially useful in the manufacture of vacuum tubes, capacitors, switches, breakers, timing devices, storage batteries, or any precision assembly where space measurements are desirable after parts are integrated.

✦ ✦ ✦

WHEN fine grain X-ray film is used, enlargements may be made for more accurate determination of element position and condition. This can serve to check component changes after certain periods of service. The scanner may also be applied to determine accurately the unknown thickness of material and to study intergranular structure of metals and plastics.

✦ ✦ ✦

Available illustrations:

Fig. 1 — Close-up view of new X-ray scanner showing adjustable slit (top) and specimen table which motor drives from left to right — Photo 01029.

Fig. 2 — View of scanner ready for use in specimen chamber of Norelco Searchray 150 unit. Electronic tube is on scanner table to be radiographed —Photo 01028.

Fig. 3 — Sketch shows principle of operation of scanner. Small section of diverving X-ray beam passes through slit to strike specimen as it traverses path from left to right—Drawing.

WIRE DRAWING MACHINERY AND EQUIPMENT
Rod Frames — 16" Frames, 8" Frames — Take-Up Frames, Wire Pointers — Puller Tongs.
General and heat resisting alloy castings for wire mill use.
Circulars on Request.
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Machinery For
Wire, Tube, and Brass Mills
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COMPOUNDS
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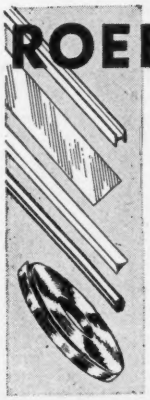
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SHAPED
WIRES and
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**DRAWING LUBRICANTS**
**Hans C. Bick, Inc.**
READING, PA.

## British Firms Develop Glass Insulation

GLASS silk fibre has been used extensively in Britain over the war years to replace pure silk which was used prewar for the insulation of very fine wires, and the rayon which was used as a first alternative but which, in turn, became equally short. This practice has now been so successfully tested under the very rigorous conditions of war time production and manufacturing and the equally severe service conditions under which the wire has been used. The glass silk fibre used for this purpose is manufactured by Fibreglass, Ltd., of Glasgow, working on license from the American patent holders. In addition to operating along already established lines, companies have made use of the material for war time purposes and put it to so many new uses that it has emerged from this period of test and research, substantially established in many industrial spheres. In the wire insulation field, the experience of one firm, the Saxonia Electric Wire Co., Ltd. of Greenwich, is interesting. InsuGlass, as they have termed this development, is being used for fine wire insulation in such products as heater cords for electric blankets and footwarmers, but is applicable to many diverse products.

✦ ✦ ✦

THEIR experience with the material is quoted as follows:

"Saxonia developed its use for insulating wires from .048 to .0048 ins. Tests made on the smaller size with a glass fibre covering of 3 to 4 mils. showed that it would withstand temperatures up to 500° C. A glass insulated nichrome wire was wound criss-cross on a mandrel in another test and connected to a 200 volt supply until it glowed red-hot. No breakdown was shown either where the turns touched each other or at sharp corners. Subsequent examination showed that the insulation remained intact and adhered to the wire.

✦ ✦ ✦

"GLASS insulation can be lapped or braided on plain copper, enameled copper, resistance wires and strands, as well as aluminum and many other alloys. By way of example, glass-covered nickel-chromium wires are playing their part in the

**WIRE WORKING MACHINERY**
2 Morgan No. 288 Bull Blocks M.D.
1 Torrington Tandem Rolling Mill M.D.
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✦ ✦ ✦

## The Bristol Company Issues New Catalog

A NEW post-war general catalog entitled, Specification Index for Bristol Instruments, has just been published by **The Bristol Company,** Waterbury 91, Conn. The catalog, No. W1800, contains twenty-four pages of information on the Bristol line of automatic controlling, recording, and indicating instruments and gives hints on how they can be used effectively to save time, and money and promote efficient operation. Specification data is given on each instrument listed. The booklet is liberally illustrated with line drawings, which show basic methods of applying various types of industrial instruments.

✦ ✦ ✦

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**For more complete information, consult the annual Wire and Wire Products Directory, Index & Buyers' Guide.**

**ABRASIVES—**
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**ACID INHIBITORS—**
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.
**ACID-PROOF CONSTRUCTION—**
Cellcote Co., The, Cleveland, Ohio
Haveg Corp., Newark, Del.
Heil Engineering Co., Cleveland, Ohio
Sauereisen Cements Co., Pittsburgh, Pa.
**AIR DRAW FURNACES—**
Carl-Mayer Corp., The, Cleveland, Ohio.
**ALKALINE CLEANERS—**
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
**ANNEALING MACHINES—**
**Open Flame**
Syncro Machine Co., Perth Amboy, N. J.
**ANNEALING POTS AND BOXES—**
National Annealing Box Co., Washington, Penna.
Scudder, E. J., Foundry & Machine Co., Trenton, N. J.
**ARMORING EQUIPMENT—**
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
**BAKERS—Rod and Wire**
Carl-Mayer Corp., The, Cleveland, Ohio
Morgan Construction Co., Worcester, Mass.
Morrison Engineering Corp., Cleveland, Ohio.
Moslo Machinery Co., Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N. Y.
**BELTS—Wire**
Wickwire Spencer Steel, New York, N. Y.
**BENDERS—**
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.
**BOBBINS—Braider & Wire Weaving**
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
**BORON CARBIDE—**
Norton Co., Worcester, Mass.
**BRAKES & SHEARS—**
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.
**BRICKS—Acid Proof**
Keagler Brick Co., Steubenville, Ohio.
**CABLE LACQUERING OVENS**
Industrial Oven Engr. Co., Cleveland, Ohio.
**CABLE—Steel and Copper**
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Wickwire Spencer Steel, New York, N. Y.
**CARRIERS—Braider, High Speed**
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
**CASTINGS—Wire Mill**
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
**CEMENTS—Acid Proof**
Sauereisen Cements Co., Pittsburgh, Pa.
**CEMENTS—Refractory**
Norton Co., Worcester, Mass.
**CHEMICALS—Cleaning**
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.
Standard Industrial Compounds Co., Chicago, Ill.
**CLEANERS—Hand and Metal**
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.
**CLEANING & PICKLING EQUIP.**
Broden Construction Co., Cleveland, O.
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Haveg Corporation, Newark, Del.
Heil Engineering Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio.
**CLOTH TESTERS—**
Scott Testers, Inc., Providence, R. I.
**CLOTH—WIRE. All Metals**
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Spencer Steel, New York, N. Y.
**COATING COMPOUNDS—**
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.
**COILERS—Sheet, Strip and Wire**
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.
**COLD HEADERS—**
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.
**COMPOUNDS—Coppering**
American Chemical Paint Co., Ambler, Pa.
**COMPOUNDS—Metal Finishing**
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
**COMPOUNDS—Rust Preventing**
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Shell Oil Co., Inc., New York, N. Y.
**COMPOUNDS—Rust Removing**
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Shell Oil Co., Inc., New York, N. Y.
Standard Industrial Compounds, Inc., Chicago, Ill.
**COMPOUNDS—Wire Drawing**
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Potter, Neil C., Newark, N. J.
Shell Oil Co., Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.
**COPHOLDERS—Steel**
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
**CRANES—Wire Mill**
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
**CUTTING TOOLS—Carbide**
Carboloy Co., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Vascoloy-Ramet Corp., North Chicago, Ill.
**CUTTING TOOLS—Wire**
Porter, H. K., Inc., Everett, Mass.
**DIAMONDS—Industrial**
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.
**DIAMOND POWDERS—**
Michigan Wire Die Co., Detroit, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Union Wire Die Corp., New York, N. Y.
United Die Co., Newark, N. J.
Wayne Wire Die Co., Hillside, N. J.
**DIAMOND TOOLS—**
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.
**DIES—Diamond**
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Michigan Wire Die Co., Detroit, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Union Wire Die Corp., New York, N. Y.
United Die Co., Newark, N. J.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.
**DIES—Lead Extrusion**
Robertson, John, Co., Brooklyn, N. Y.
Wayne Wire Die Co., Hillside, N. J.
**DIES—Repairs & Re-Cutting**
Ajax Industrial Supplies Co., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Michigan Wire Die Co., Detroit, Mich.
New England Wire Die Co., Worcester, Mass.
New Jersey Carbide Die Co., Jersey City 4, N. J.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Union Wire Die Corp., New York, N. Y.
United Die Co., Newark, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.
**DIES—Rod and Tube Drawing**
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Michigan Wire Die Co., Detroit, Mich.
New Jersey Carbide Die Co., Jersey City 4, N. J.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Tungsten Electric Corp., Union City, N. J.
United Die Co., Newark, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.
**DIES—Tantalum Carbide**
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
New Jersey Carbide Die Co., Jersey City 4, N. J.
Rusch Wire Die Corp., New York, N. Y.
United Die Co., Newark, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.
**DIES—Tungsten Carbide**
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Michigan Wire Die Works, Detroit, Mich.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Tungsten Electric Corp., Union City, N. J.
United Die Co., Newark, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.
**DRAW BENCHES—**
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Foundry & Machine Co., Trenton, N. J.
Standard Machinery Co., Providence, R. I.
Vaughn Machinery Co., Cuyahoga Falls, O.
**DRUMS—Flange Steel**
Hubbard Spool Co., Chicago, Ill.
Stevens Metal Products Co., Niles, Ohio.
**DRUMS—Vulcanizing**
Mossberg Pressed Steel Corp., Attleboro, Mass.
**DRYING & PRE-HEATING ROOMS**
Carl-Mayer Corp., Cleveland, Ohio.
Industrial Oven Engr. Co., Cleveland, Ohio.
**DRYING EQUIPMENT**
Carl-Mayer Corp., Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N. Y.
**ENGINEERS—Consulting Wire Mill**
Aufhauser Brothers Co., New York 5, N. Y.
Lewis, Kenneth B., Worcester, Mass.
Syer, C. Raymond, Westport, Conn.
Wiel, L D., New York, N Y.
**EQUIPMENT—Insulation Testing**
Davis, R. L., Electric Co., Wallingford, Conn
Entwistle, James L., Co., Pawtucket, R. I.
**EYELETS—Brass or Zinc**
Platt Bros. & Co., The, Waterbury, Conn.
**FENCES AND FENCING—Wire**
Wickwire Spencer Steel, New York, N. Y.
**FLASH BAKER—**
Morrison Engineering Corp., Cleveland, Ohio.
**FLUXES—Soldering**
American Chemical Paint Co., Ambler, Pa.
**FOAM PRODUCING COMPOUNDS—**
American Chemical Paint Co., Ambler, Pa.
Parkin, Wm. M., Co., Pittsburgh, Pa.
**FRICTION PAY-OFF STANDS—**
Industrial Oven Engr. Co., Cleveland, Ohio.
**FURNACES—Annealing**
Carl-Mayer Corp., The, Cleveland, Ohio.

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Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Morrison Engineering Corp., Cleveland, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

**FURNACES—Automatic**
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Morrison Engineering Corp., Cleveland, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

**FURNACES—Brazing**
Electric Furnace Co., Salem, Ohio.
Firth-Sterling Steel Co., McKeesport, Pa.

**FURNACES—Bright Annealing**
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

**FURNACES—Electric**
Eisler Engineering Co., Newark 3, N. J.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.

**FURNACES—Galvanizing Equipment**
Electric Furnace Co., Salem, Ohio
Furnace Engineers, Inc., Pittsburgh, Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Surface Combustion Corporation, Toledo, O.
Wilson, Lee, Engineering Corp., Cleveland, Ohio

**FURNACES—Hard'ing & Temp'ing**
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.

**FURNACES—Lead Melting**
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Robertson, John, Co., Brooklyn, N. Y.
Surface Combustion Corp., Toledo, Ohio.

**FURNACES—Non-Oxidizing**
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Morrison Engineering Corp., Cleveland, O.
Surface Combustion Corp., Toledo, Ohio.

**FURNACES—Normalizing**
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Morrison Engineering Corp., Cleveland, Ohio.
Surface Combustion Corp., Toledo, Ohio.

**FURNACES—Salt Bath**
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corporation, Toledo, Ohio.

**FURNACES—Wire, Strip & Sheet**
Carl-Mayer Corp., The, Cleveland, Ohio.
Eisler Engineering Co., Newark 3, N. J.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Morrison Engineering Corp., Cleveland, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

**FURNACES—Galvanizing Equipment**
Furnace Engineers, Inc., Pittsburgh, Pa.
Wilson, Lee, Engr. Co., Cleveland, Ohio

**GALVANIZING KETTLES**
National Annealing Box Co., Washington, Penna.

**GOVERNMENT SURPLUS MATERIALS—**
War Assets Corporation, New York, N. Y.

**GRINDERS—Roll**
Norton Co., Worcester, Mass.

**HOISTS—Electric Travelling**
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

**INHIBITORS—Pickling**
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M. Co., Pittsburgh, Pa.

**INSULATING LACQUERING SYSTEMS—Continuous**
Industrial Oven Engr. Co., Cleveland, Ohio.

**INSULATING MATERIALS—**
Crepe-Kraft Co., Newark. N. J.
Du Pont de Nemours, E. I. & Co., Wilmington, Del.
Standard Varnish Works, Staten Island, N. Y.

**KETTLES—Galvanizing, Annealing, Tinning, etc.**
National Annealing Box Co., Washington, Penna.

**LATHES—Die Reaming**
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Morgan Construction Co., Worcester, Mass.
Roos, H. & G., Tool & Mfg. Co., Montclair, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry & Machine Co., Waterbury, Conn.

**LININGS—Acid and Alkali Proof**
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Heil Engineering Co., Cleveland, Ohio.

**LUBRICANTS—For Metal Cutting, Stamping and Drawing**
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

**LUBRICANTS—Wire Drawing**
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Procter & Famble, Cincinnati, Ohio.
Standard Industrial Compounds Co., Chicago, Ill.

**MACHINERY—Armoring (Cable, Wire Hose)**
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Braiding**
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Brazing**
Syncro Machine Co., Perth Amboy, N. J.

**MACHINERY—Bunching**
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

**MACHINERY—Bundling, Scrap**
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

**MACHINERY—Cable, Electric**
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Chain Making**
Nilson, A. H., Machine Co., Bridgeport, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

**MACHINERY—Cable, Rope Closing**
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Coil Winding**
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

**MACHINERY— Coilers**
Broden Construction Co., Cleveland, Ohio.
Eisler Engineering Co., Newark 3, N. J.
Morgan Construction Co., Worcester, Mass.
New England Butt Co., Providence, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Copper Wire Drawing and Rolling**
American Insulating Mach'y Co., Phila., Pa.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

**MACHINERY—Covering Wire**
American Insulating Mach'y Co., Phila., Pa.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Cutting**
Broden Construction Co., Cleveland, Ohio.
Eisler Engineering Co., Newark 3, N. J.
Lewis Machine Co., The, Cleveland, Ohio.
Moslo Machinery Inc., Cleveland, Ohio.
National Machinery Exchange (Used), New York, N. Y.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Porter, H. K., Inc., Everett, Mass.
Shuster, F. B. Mfg. Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

**MACHINERY—Die Making**
Carboloy Co., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Roos, H. & G., Tool & Mfg. Co., Montclair, N. J.
Union Wire Die Corp., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

**MACHINERY—Draw Benches**
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

**MACHINERY—Edging**
Broden Construction Co., Cleveland, Ohio.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.

**MACHINERY—Enameling**
American Insulating Mach'y Co., Phila., Pa.
Industrial Oven Engineering Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.

**MACHINERY—Extruding**
Robertson, John, Co., Brooklyn, N. Y.
Royle, John, & Sons, Paterson, N. J.

**MACHINERY—Fence**
Broden Construction Co., Cleveland, Ohio
Glader, Wm., Machine Works, Chicago, Ill.

**MACHINERY—Filament Coil Winding**
Eisler Engineering Co., Newark 3, N. J.

**MACHINERY—Flat Wire**
Broden Construction Co., Cleveland, Ohio.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

**MACHINERY— Forming**
Eisler Engineering Co., Newark 3, N. J.
National Machinery Exchange (Used), New York, N. Y.
Nilson, A. H., Machine Co., Bridgeport, Conn.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.
Seifert, E. R., Inc., Syracuse, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.

**MACHINERY—Galvanizing**
Wilson, Lee, Engr. Co., Cleveland, Ohio.

**MACHINERY—Galvanizing Wire**
Broden Construction Co., Cleveland, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

**MACHINERY—Gang Winders**
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Grinding**
Norton Co., Worcester, Mass.

**MACHINERY—Insulating**
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Royle, John, & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Lead Encasing Presses, etc.**
Robertson, John, Co., Brooklyn, N. Y.

**MACHINERY—Lead Stripping**
Robertson, John, Co., Brooklyn, N. Y.

**MACHINERY—Lock Washer**
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

**MACHINERY—Magnet Wire**
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

**MACHINERY—Material Handling**
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

**MACHINERY—Measuring Wire & Cable**
Durant Mfg. Co., Milwaukee, Wis.
Lyon-Vail Machine Co., Brockton, Mass.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Nail and Tack**
Broden Construction Co., Cleveland, Ohio.
Glader, Wm., Machine Works, Chicago, Ill.
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

**MACHINERY—Panning**
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.

**MACHINERY—Pointing**
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.

# WHERE TO BUY, Continued

Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

**MACHINERY—Rod Mill**
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.

**MACHINERY—Rolling Mill**
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

**MACHINERY—Rubber for Insulating Wire**
Royle, John, & Sons, Paterson, N. J.

**MACHINERY—Rubber Tubing and Straining**
New England Butt Co., Providence, R. I.
Royle, John, & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

**MACHINERY—Screw Wire**
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

**MACHINERY—Special**
American Insulating Mach'y Co., Phila., Pa.
Broden Construction Co., Cleveland, Ohio.
Emory, Robert J., Co., Newark, N. J.
New England Butt Co., Providence, R. I.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I. (Special Designs)
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Spooling**
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark 3, N. J.
Emory, Robert J., Co., Newark, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Spring Making**
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

**MACHINERY—Staple**
Sleeper & Hartley, Inc., Worcester, Mass.

**MACHINERY—Straightening**
Broden Construction Co., Cleveland, Ohio.
Lewis Machine Co., The, Cleveland, Ohio.
Moslo Machinery Co., Cleveland, Ohio.
National Machinery Exchange (Used), New York, N. Y.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Ruesch, H. J., Machine Co., Newark, N. J.
Shuster, F. B. Mfg. Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

**MACHINERY—Stranding**
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Strip Steel**
Broden Construction Co., Cleveland, Ohio.
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

**MACHINERY—Swaging**
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

**MACHINERY—Taping**
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Testing Equipment—Sparkers**
Davis, R. L., Electric Co., Wallingford, Conn.
Entwistle, Jas. L., Pawtucket, R. I.

**MACHINERY—Testing Spring**
Standard Machinery Co., Providence, R. I.

**MACHINERY—Tinsel Rolling Mills**
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

**MACHINERY—Trolley Wire**
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

**MACHINERY—Tube Mill**
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co, Torrington, Conn.

**MACHINERY—Welding Wire**
Aufhauser Brothers Co., New York 5, N. Y.
Eisler Engineering Co., Newark 3, N. J.
Micro Products Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.

**MACHINERY—Winding**
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark 3, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

**MACHINERY — Wind-up (Constant Tension, Variable Speed**
Industrial Oven Engr. Co., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Wire Bending**
Eisler Engineering Co., Newark 3, N. J.
Nilson, A. H., Machine Co., Bridgeport, Conn.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

**MACHINERY—Wire Drawing**
American Insulating Mach'y Co., Phila., Pa.
Broden Construction Co., Cleveland, Ohio.
Eisler Engineering Co., Newark 3, N. J.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

**MACHINERY—Wire Rope**
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**MACHINERY—Wire Tinning**
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.

**MACHINERY—Wood Screw**
National Machinery Exchange (Used), New York, N. Y.

**MATERIAL HANDLING EQUIPMENT—**
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

**MILLS—Tandem Rolling and Edging**
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co, Torrington, Conn.

**NAILS—Wire**
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

**NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip**
Hudson Wire Co., Ossining, N. Y.

**OILS—Wire Drawing**
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Procter & Gamble, Cincinnati, Ohio.
Shell Oil Co., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

**OVENS—Cable Lacquering**
American Insulating Mach'y Co., Philadelphia, Pa.
Industrial Oven Engr. Co., Cleveland, Ohio.
Morrison Engineering Corp., Cleveland, Ohio.

**OVENS—Dehydrogenizing**
Carl-Mayer Corp., Cleveland, Ohio.
Industrial Oven Engr. Co., Cleveland, Ohio.

**OVENS—Industrial**
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Oven Engr. Co., Cleveland, Ohio.
Morrison Engineering Corp., Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N. Y.

**OVENS—Welding Rod Coating**
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Oven Engr. Co., Cleveland, Ohio.
Morrison Engineering Corp., Cleveland, Ohio.
Moslo Machinery Co., Cleveland, Ohio.

**PAINTS—Heat Resisting**
American Chemical Paint Co., Ambler, Pa.

**PAINTS—Marine**
American Chemical Paint Co., Ambler, Pa.

**PAINTS—Structural Steel**
American Chemical Paint Co., Ambler, Pa.

**PANS—Lead and Spelter**
National Annealing Box Co., Washington, Penna.

**PANS—Vulcanizing**
Mossberg Pressed Steel Corp., Attleboro, Mass.

**PAPER—Creped Wrapping**
Crepe-Kraft Co., Newark, N. J.

**PAPER—For Coil Wrapping and Corrosion Prevention**
Crepe-Kraft Co., Newark, N. J.

**PAPER TESTERS—**
Scott Testers, Inc., Providence, R. I.

**PATENT ATTORNEYS—**
Lancaster, Allwine and Rommel, Washington, D. C.

**PICKLING COMPOUNDS—**
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.

**PICKLING TANK LININGS—**
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Heil Engineering Co., Cleveland, Ohio.
Keagler Brick Co., Steubenville, Ohio.
Sauereisen Cements Co., Pittsburgh, Pa.

**PIPES & FITTINGS—Acid Resistant**
Ceilcote, The, Co., Cleveland, Ohio
Haveg Corp., Newark, Del.
Heil Engineering Co., Cleveland, Ohio.

**PLASTIC TESTERS—**
Scott Testers, Inc., Providence, R. I.

**POTS—Lacquer**
Industrial Oven Engr. Co., Cleveland, Ohio.

**POTS—Lead Melting**
National Annealing Box Co., Washington, Pa.
Robertson, John, Co., Brooklyn, N. Y.

**POWDER—Wire Drawing**
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Homer, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

**PRESSES—Hydraulic and Mechanical**
Robertson, John, Co., Brooklyn, N. Y.
Standard Machinery Co., Providence, R. I. (Mechanical Only)

**PRESSES—Lead**
Robertson, John, Co., Brooklyn, N. Y.

**PRESSURE VESSELS—**
National Annealing Box Co., Washington, Penna.

**PULLERS—Wire**
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

**PUMPS—Hydraulic**
Robertson, John, Co., Brooklyn, N. Y.

**REEL AND TENSION STAND—**
Industrial Oven Engr. Co., Cleveland, O.
Moslo Machinery Co., Cleveland, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

**REEL CRUTCHES—**
Watson Machine Co., Paterson, N. J.

**REELS—Annealing and Stranding**
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.

# WHERE TO BUY, Continued

Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

**REELS—Steel**
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

**REELS AND SPOOLS—Shipping and Shop**
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

**REELS—Takeoff**
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Shuster, F. B. Mfg. Co., New Haven, Conn.
Stevens Metal Products Co., Niles, Ohio.

**REELS—Vulcanizing & Impregnating**
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

**REELS—Wire Drawing**
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

**REFACTORIES—High Temperature**
Norton Company, Worcester, Mass.

**ROD BAKERS—**
Carl-Mayer Corp., The, Cleveland, Ohio.
Morrison Engineering Corp., Cleveland, Ohio.
Moslo Machinery Co., Cleveland, Ohio
Ross, J. O., Engineering Corp., New York, N. Y.

**RODS—Stainless Steel—**
Rustless Iron & Steel Div., American Rolling Mill Co., Baltimore, Md.

**RODS—Wire—Non-Ferrous**
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.

**RODS—Wire—Steel**
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Spencer Steel, New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

**ROLL STRAIGHTENERS—**
Moslo Machinery Co., Cleveland, Ohio.

**ROPE—Wire**
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Spencer Steel, New York, N. Y.

**RUBBER AND RUBBER COMPRESSION TESTERS—**
Scott Testers, Inc., Providence, R. I.

**RUST PROOF COMPOUNDS—**
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.

**RUST REMOVING COMPOUNDS—**
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Heil Engineering Co., Cleveland, Ohio
Standard Industrial Compounds Co., Chicago, Ill.

**SATURATION SYSTEMS—**
Industrial Oven Engr. Co., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.

**SHEARS—**
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

**SHEET—Steel**
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.

**SOAPS—Industrial and Wire Drawing**
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Potter, Neil C., Newark, N. J.
Procter & Gamble, Cincinnati, Ohio.
Shell Oil Co., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

**SOLVENT RESIN SYSTEMS—Experimental**
Industrial Oven Engr. Co., Cleveland, Ohio.

**SPOOLS—Annealing and Wire Drawing**
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

**SPOOLS—Shipping and Shop**
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

**SPOOLS—Steel**
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

**SPRINGS—Steel**
Wickwire Spencer Steel, New York, N. Y.

**SPRINGS—Tools for Forming—**
State Machine Tool Co., Hartford, Conn.

**STAMPINGS—Steel**
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

**STRAND—Steel and Copper**
Wickwire Spencer Steel, New York, N. Y.

**STRIP—Brass and Non-Ferrous**
Hudson Wire Co., Ossining, N. Y.

**STRIP—Steel**
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Spencer Steel, New York, N. Y.

**SWIFTS—Take-off**
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Watson Machine Co., Paterson, N. J.

**TANK LININGS—Brick**
Ceilcote Co., The, Cleveland, Ohio.
Keagler Brick Co., Steubenville, Ohio.

**TANKS—Compound**
Haveg Corp., Newark, Del.
Watson Machine Co., Paterson, N. J.

**TANKS—Pickling**
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Heil Engineering Co., Cleveland, Ohio.
Sauereisen Cements Co., Pittsburgh, Pa.

**TANKS—Steel**
Mossberg Pressed Steel Corp., Attleboro, Mass.
National Annealing Box Co., Washington, Pa.

**TESTING INSTRUMENTS—**
Davis, R. L., Electric Co., Wallingford, Conn.

**TOOLS—Spring Forming—**
State Machine Tool Co., Hartford, Conn.

**TOOLS—Wire Cutting**
Porter, H. K., Inc., Everett, Mass.

**TRAMRAIL SYSTEMS—**
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

**TRAVERSES—For Reels**
Hubbard Spool Co., Chicago, Ill.
Stevens Metal Products Co., Niles, Ohio.

**TRAVERSE MECHANISMS—**
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Co., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

**TREADS—Safety**
Norton Co., Worcester, Mass.

**TUBE BENDERS AND FORMERS—**
Ruesch, H. J., Machine Co., Newark, N. J.

**TURKS HEADS—Friction and Power**
Standard Machinery Co., Providence, R. I.

**VALVES AND FITTINGS—Acid Resistant**
Haveg Corp., Newark, Del.

**VARNISHES—For Insulation**
Standard Varnish Works, Staten Island, N.Y.

**VULCANIZERS—**
Watson Machine Co., Paterson, N. J.

**VULCANIZING PANS—**
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

**WELDERS—Spot and Butt**
Eisler Engineering Co., Newark 3, N. J.
Micro Products Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.

**WIND-UP AND UNWIND SYSTEMS—Continuous**
American Insulating Mach'y Co., Philadelphia, Pa.
Davis, R. L., Electric Co., Wallingford,
Entwistle, James L., Co., Pawtucket, R. I.
Industrial Oven Engr. Co., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.

**WIRE—Aluminum**
Aluminum Co. of America, Pittsburgh, Pa.

**WIRE—Cast**
Youngstown Sheet & Tube Co., Youngstown, Ohio.

**WIRE—Cold Heading**
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's, John A. Sons, Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

**WIRE—Electric**
Hudson Wire Co., Ossining, N. Y.

**WIRE—Enameled for Coils**
North American Philips Corp., Dobbs Ferry, N. Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

**WIRE—Manufacturers**
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's, John A. Sons, Co., Trenton, N. J.
Rustless Iron & Steel Div., American Rolling Mill Co., Baltimore, Md.
Wickwire Spencer Steel, New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

**WIRE—Music**
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.

**WIRE—Nickel Silver and Phosphor Bronze**
Hudson Wire Co., Ossining, N. Y.

**WIRE—Non-Ferrous to Specification for Special Purposes**
Hudson Wire Co., Ossining, N. Y.
North American Philips Corp., Dobbs Ferry, N. Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

**WIRE—Spring**
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Rustless Iron & Steel Div., American Rolling Mill Co., Baltimore, Md.
Wickwire Spencer Steel, New York, N. Y.

**WIRE—Stainless Steel**
Firth-Sterling Steel Co., McKeesport, Pa.
Rustless Iron & Steel Div., American Rolling Mill Co., Baltimore, Md.

**WIRE—Steel—Also Coppered Steel—Also Galvanized Steel**
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Wickwire Spencer Steel, New York, N. Y.

**WIRE TESTERS—**
Scott Testers, Inc., Providence, R. I.

**WIRE—Zinc**
Platt Bros. & Co., The, Waterbury, Conn.

**WIRE, WEAVING—Non-Ferrous**
Hudson Wire Co., Ossining, N. Y.

**WIRE WINDER—**
Standard Mill Supply Co., Providence, R. I.

**WRAPPING PAPER—Creped**
Crepe-Kraft Co., Newark, N. J.

**YARNS & TAPES—**
Du Pont de Nemours, E. I. & Co., Wilmington, Del.

**YARN TESTERS—**
Scott Testers, Inc., Providence, R. I.

# The WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON 3, NEW JERSEY, U. S. A.

Wire & Wire Products

March 1946

ELECTRICAL WIRE AND CABLE AND WIRE ROPE MACHINERY


## ELECTRIC PATCH VULCANIZERS

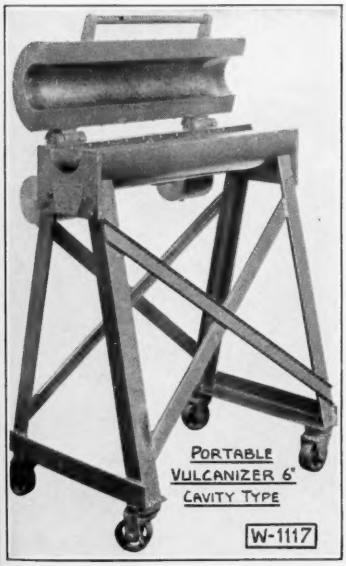
**"FLAT PLATE" and "CAVITY" types.**

The **FLAT PLATE** (on post) type can be provided with either **"Air-operated"** jaw (as per cuts W-1763 A & B) or with **"Hand-wheel"** screw opening jaw.

| FLAT PLATE TYPE | | | |
|---|---|---|---|
| SIZE IN WATTS | Die-Set Dimensions Width | × Thickness | × Length |
| 1000 | 5″ | 1¾″ | 7″ |
| 2000 | 5″ | 2¾″ | 10″ |
| 2800 | 5⅞″ | 3¾″ | 14″ |

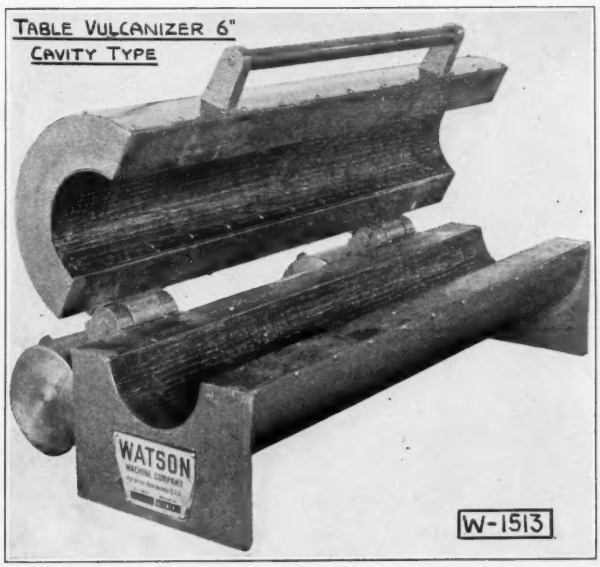
**Die sets** for FLAT PLATE type can be provided with up to 5 grooves to the number and diameter allowed by the cross-section.

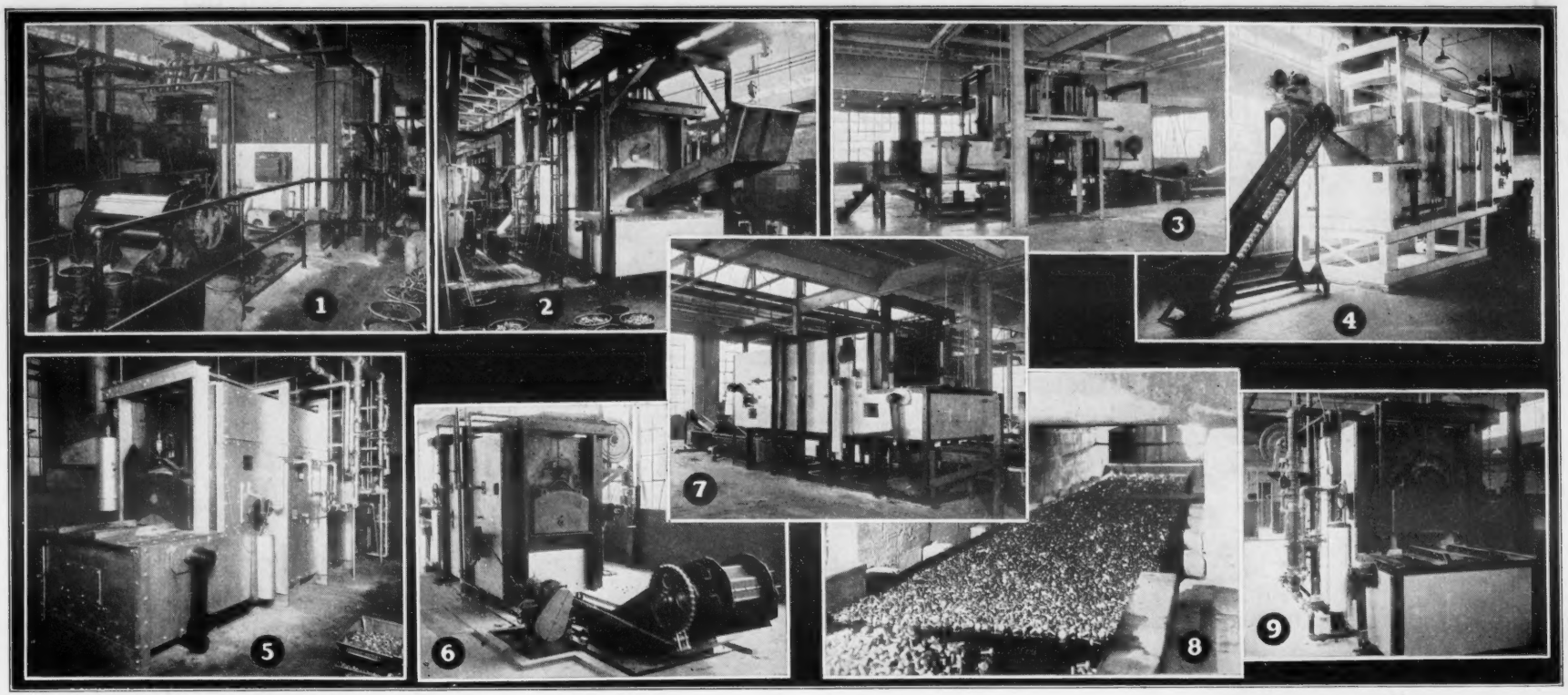
## All Are Wired For Voltages To 250, And Are Equipped With Thermostatic 370° To 650° F. Controls



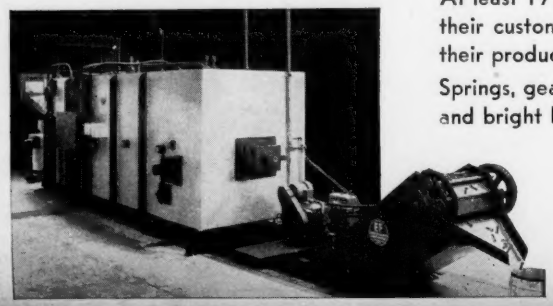

The **"CAVITY"** type is built in two styles — either for **"Table"** mounting, as per cut W-1513, or on **"Portable"** carriage, as per cut W-1117.

| CAVITY TYPE | | |
|---|---|---|
| Size in Watts | Cavity Diam. x Length | |
| 2000 | 4″ | 24″ |
| 4500 | 6″ | 32″ |
| 9000 | 10″ | 36″ |





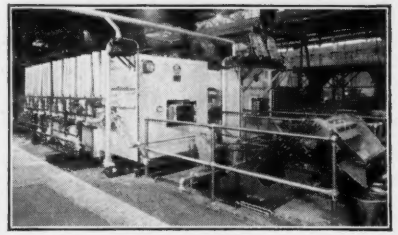

# 19 Prominent Bolt Manufacturers



At least 19 prominent bolt manufacturers are meeting their production schedules and their customers' demands for tough, uniformly hard bolts and nuts, by heat treating their products in EF continuous chain belt furnaces.

Springs, gears, bearing parts, and many other parts and products are also being clean and bright hardened in EF special atmosphere chain belt furnaces.

**We build these furnaces in sizes with capacities ranging from 175 to 2,000 pounds per hour . . . either electrically heated or fuel fired. We would be glad to furnish complete data on the best size and type to handle your products and production, if interested.**



This EF gas fired radiant tube furnace is one of three chain belt furnaces we installed in one plant for scale-free hardening bolts, screws, nuts, etc.

## The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired, and Electric Furnaces — For Any Product, Process or Production

**The Electric Furnace Co., Salem, Ohio**

Gas Fired, Oil Fired, and Electric Furnaces — For Any Product, Process or Production